

THE  
AMERICAN JOURNAL OF PHARMACY.

~~~~~  
NOVEMBER, 1861.  
~~~~~

MEETING OF THE BRITISH ASSOCIATION AT MANCHESTER,  
SEPTEMBER 4, 1861.

*(Extracts from a letter from an American gentleman, attending the Sessions.)*

The first regular session was held in the evening, at the Free Trade Hall, at 8 o'clock, when the meeting was opened by the President of last year, Lord Wrottesley, who, in a short and appropriate speech, took leave of the Association in his official capacity, and, in very laudatory terms, introduced the new President, William Fairbairn, Esq., LL.D., F.R.S., &c. Mr. Fairbairn read his address. The audience, which included many ladies, could not have numbered less than two thousand, many of whom were unable to procure seats; and from the size of the room very many could not hear the speaker. While the President was speaking, a number of pages carried around his printed address among those who could not hear: so that they could, at least, by reading, become acquainted with the nature of the speaker's remarks. It may be stated in reference to the address, that, though in point of delivery and diction not remarkable, it nevertheless possessed much interest from the value of the facts and observations contained in it.

A man may be, as Mr. Fairbairn seems to be, an excellent engineer, of great natural genius, and profoundly versed in mechanics, both theoretic and applied, without being either a good speaker or a remarkable writer. He stands high among the mechanical philosophers of Manchester, perhaps at their head.

*Sept. 5th.* On this day the business of the Sections began. Of these there are eight; 1, Mathematics and Physics; 2, Chemistry; 3, Geology; 4, Zoology and Botany; 5, Physiology;

6, Geography and Ethnology; 7, Economics and Statistics; and 8, Mechanics. At the reception room every morning, a printed programme of the day's proceedings is presented to each member, so that he may make his choice among the sections; but, as it often happens that interesting papers are read at the same time in different sections, it is impossible to hear all that may be desired. The reading of papers begins at 11 o'clock, A. M. Our correspondent, wishing to hear the address of Sir Roderick I. Murchison, who presided over the geological section, attended punctually at the hour; but every seat was filled, and even the galleries crammed, so as to be inconvenient even for standing. He next went to the chemical section, and arrived in time to hear the last words only of the address of Professor Miller, of King's College, London, who presided.

A report next followed on the *Chemical Manufactures* of South Lancashire, of which Manchester is the business centre. It gave the statistics of these manufactures, but was devoted more especially to an account of the improvements in them which had taken place within the last ten or twelve years. This was the part of the report which especially attracted attention, and a few of the points touched upon are here noted:

1. Platinum retorts have generally been abandoned in South Lancashire in the distillation or concentration of sulphuric acid, large glass retorts having been substituted, which are now made of a quality so good as to be perfectly safe and admirably adapted to the purpose. The Report stated that the acid is obtained more free from color when distilled from glass, than from the metallic retorts. Unless, however, the quality of the glass retorts should be decidedly superior, the value of this substitution is likely to be less, now that a process has been discovered by which platinum can be readily melted and worked in large quantities, which should reduce the cost of the retorts made of this metal.

2. In the manufacture of sulphuric acid, some now use, as the exclusive source of the sulphurous acid, a material which has been employed in the purification of coal gas, it being a form of sesquioxide of iron, which, in the purifying process, is used over and over again, until it becomes so sulphuretted by the absorption of sulphur from the gas, as to contain forty per cent. of

that element. The chief interest attached to this new application is the utilization of a waste disagreeable product which otherwise would be a nuisance.

3. In making bleaching powder or *chlorinated lime*, chloride of chromium has been to a considerable extent substituted, as the source of chlorine, for the black oxide of manganese and common salt.

4. The *aluminous shale*, found in contact with coal strata, is now very much used in South Lancashire in the manufacture of alum. The shale is calcined to destroy the bituminous and coloring matter, and then treated with sulphuric acid and the ammoniacal liquor of gas works simultaneously; as it is not necessary first to form the sulphate of alumina and then to add the ammoniacal liquor, if care be taken that the mixture, when added, should have a decided excess of acid. As much as 110 tons a week are now made by this process, equal, the reporter said, to more than one-third of the whole of the alum made in England.

5. *Sawdust* has to a great extent been substituted for pieces of wood, in the manufacture of pyroligneous acid, on economical grounds.

6. A new process for *oxalic acid* has almost entirely superseded the old one of acting on sugar or starch by nitric acid. It is based on the fact that this acid results, in large quantities, from the reaction between caustic alkalies and certain organic substances. The substance chosen is sawdust, which is treated by a mixture of two equivalents of soda and one of potassa. It has been found that a mixture of the two alkalies is essential to the proper working of the process; but the reporter did not seem to understand precisely why. The alkalies had been tried separately, and were not found to answer. A concentrated solution is formed of them, with which the sawdust is mixed to the consistence of a thick paste, which is then spread in thin layers on iron plates, and gradually heated to 400° F., at which temperature it must be kept for an hour or two. The heat must not exceed this. A dark brown mass is thus produced which is soluble in water. Besides oxalic acid, some formic acid is produced, but very little acetic. Some manipulation here followed, which our correspondent failed to record, and after it the mass

is again heated as before. It now contains from 28 to 30 per cent. of oxalic acid, which exists combined with the soda, and probably also with the potassa. The mass is then treated with water which dissolves out everything, except the oxalate of soda, which is a comparatively insoluble salt; and this insolubility is probably the cause why, on the addition of water, the oxalate of potassa and the soluble soda salt, of formic and acetic acids, interchange their constituents, so that the relatively insoluble oxalate of soda is produced. The oxalate of soda is decomposed by carbonate of lime, producing oxalate of lime, which is then, finally, treated with sulphuric acid. Two pounds of sawdust yield a pound of oxalic acid.

7. *Garancin*, a product resulting from the action of sulphuric acid on madder, and which has been substituted to a great extent for madder itself in dyeing, is produced to the amount of 1200 tons per annum in South Lancashire. All the madder colors are obtainable from garancin, except the *pink*, for which the dyer requires the root itself.

8. The *anilin* coloring salts are largely prepared for use in dyeing.

9. Considerable quantities of *murexide* (purpurate of ammonia,) are now prepared from *guano*, and used in dyeing. It produces splendid purples, of which specimens were shown to the members.

In the evening a grand soiree was given at the Free Trade Hall, attended by a numerous throng of ladies and gentlemen, with a display of a vast number of things, illustrative of all the kingdoms of nature, and most of the branches of art; from a Whitworth's gun, which was breech-loading, and would carry a 12 pound ball six miles, to a series of bird's eggs, which appeared sufficiently numerous to be counted by thousands.

*Sept. 6th.* In the evening, Prof. Miller gave a lecture, by invitation, to the members of the Association, forming an audience of nearly 2000, upon a subject of much interest,—the spectrum analysis of Messrs. Bunsen and Kirchoff. The lecture was clear, well delivered, and admirably illustrated. It has long been known that, when the rays forming the solar spectrum pass through a slit instead of a round opening, the spectrum itself is traversed, at right angles, by a great number of black



or dark colored lines, parallel in position, but of various dimensions, and irregularly distributed. Another fact known for some time is, that bodies, rendered intensely luminous by a great heat, also form spectra, each of which is peculiar, so as to characterize the body. One substance yields one color of special brightness; another, another; and the shape, size and relative position of these strips of color are also characteristic. A third fact in the series is that a substance which, when intensely heated, gives a peculiar color of special brightness, absorbs that same color at a lower temperature; in other words, a body gives out, at a high heat, the peculiar light it absorbs when at a lower one. Hence, if a substance, in the form of vapor, be made to intervene between the source of light and the solar spectrum, it produces a dark line in the same position, and exactly of the same shape and size as the luminous line which characterizes it in its own spectrum. Still another fact is, that any of the metals, if put between the poles of a suitable galvanic battery, or other sufficiently powerful electric arrangement, may be brought to such a luminous condition as to yield characteristic spectra; and thus, an exceedingly easy method of experimenting, for the detection of metals, is afforded. Each of the metals yields a peculiar color, and all the salts of the same metal the same color, probably because all of them are reduced to the metallic state by the intense heat.

Now, what may be considered as an almost sublime result of these premises is, that we are enabled to analyze the atmosphere of the sun itself. The dark lines of the solar spectrum may be, in some degree, owing to the absorbing influence of substances in the outer layer of the sun's atmosphere, intervening between the central source of light and the eye. Some of these dark lines correspond exactly with the luminous lines of certain known bodies, as sodium, iron, &c., and may, therefore, in accordance with the above data, be ascribed to the vapors of these bodies in the outer solar atmosphere. It is said that, in relation to sodium, the correspondence is so entirely precise, that the inference is irresistible. But (says our correspondent) why should not the presence of sodium in space, or in our own atmosphere, have the same effect? and so in relation to all other metals; for the quantity requisite to produce the effect is

miraculously small. It is presumed, however, that a source of fallacy, so obvious, must have been guarded against; though nothing was said, so far as heard, on this point in the lecture. The stars also yield spectra; and, perhaps, it is by the absence of precisely the same dark lines in these, that their peculiarity, as observed in the solar spectrum, must be referred to the sun itself, and not to the space in which he moves, or to our atmosphere.

Another great advantage of this discovery of the peculiar spectra produced by the metals, is that it may be applied to the purposes of analysis, so as to detect the presence of these bodies in proportions far too minute to be detected by the ordinary methods. The new metals, *cæsium* and *rubidium*, were discovered in this way, and afterwards obtained in a separate state by the ordinary processes.\*

*Sept. 7th.*—This morning, at the physiological section, Dr. Davy, the brother of Sir Humphry, presided, and read a paper in opposition to the popular notion of the *sudden* change of the color of hair from black to gray, or even white, under the influence of strong emotions. There were two other papers read before this section; one by Dr. Lionel Beale, on the ultimate constitution of the body, considered in reference to its microscopic constituents, which was highly interesting; and a second by Dr. Richardson, of London, on the subject of resuscitation, of which the most important point was that, judging from very numerous experiments of his own, galvanism should never be used as a substitute for artificial respiration; because, though it may bring muscles into play, it soon exhausts them, and renders them insusceptible to the ordinary physiological influences.

In the evening there was a grand *soirée*, the chief amusement at which was the sending and receiving telegraphic messages, first to and from different towns in the United Kingdom, then successively to and from Paris, St. Petersburg, Moscow, and even Odessa. It appeared that not more than two or three

\* Those of our readers who feel disposed to look further into this extraordinary discovery, will find a figure of the apparatus used by Bunsen and Kirchhoff, and a more detailed account of their process, at page 224 of the May number of this Journal.—*Editor Am. Journ. Pharm.*

minutes intervened in receiving answers even from the remotest points. No doubt every thing had been pre-arranged, so that, at each point, a person was ready at the precise moment.

## ON THE RESINS AND AQUEOUS EXTRACT OF JALAP.

BY JOHN C. LONG.

(An Inaugural Essay.)

The plant (*Ipomea jalapa*) has been so fully described in every systematic treatise upon *Materia Medica*, since Dr. J. R. Coxe, formerly Professor of *Materia Medica* in the University of Pennsylvania, decided authoritatively the question relating to the origin of the plant furnishing the jalaps of commerce, that here a detailed account is deemed entirely unnecessary. In compliance with the expressed wish of Dr. R. P. Thomas, our worthy Professor of *Materia Medica*, when lecturing on Jalap, that some member of the class would examine and determine unequivocally "whether the aqueous extract of jalap, deprived of the resins, was possessed of any purgative properties," I have made the following experiments.

A summary of the experiments of Gerber, Henry and other chemists equally distinguished, is here given, that the experiments I have instituted may be more intelligible:

*Gerber's Analysis.*

Hard resin	7.8
Soft resin	3.2
Slightly acrid extractive	17.9
Gummy extractive	14.4
Coloring matter	8.2
Uncryst. sugar	1.9
Gum with some salts	15.6
Bassorin, starch	9.2
Vegetable albumen	4.7
Water	4.
Salts of lime	
Magnesia and potassa	13.1

---

Jalap 100.0

*Henry's Analysis.*

Resin	12
Extractive	15
Starch	19
Woody fibre	54
Jalap	100

*Analysis of the Resins.*

Hard resin	70
Soft resin	30

---

Jalap 100

A. Two thousand grains of jalap, in fine powder, mixed with three times its bulk of well-washed sand, were treated with water by displacement until thoroughly exhausted, the fluid passing colorless and almost tasteless. The percolate was then carefully evaporated, over a water bath, to the consistence of a semi-solid extract. This extract was then subjected to the action of alcohol and ether to remove the resins; by first throwing the aqueous extract into twelve fluid ounces of alcohol, 95 per cent., agitating and decanting the solution, which was of a light brown color, possessing a strong jalap odor. It was then treated with another portion of alcohol (f. 3xij.) of the same strength and heated to the boiling point. The residue was then treated with successive portions of ether, as long as it became colored. The ethereal washings were of a light yellow color, having but little odor and taste.

The alcoholic liquids were now mixed and yielded, on evaporation, five drachms of the impure resin.

B. Two thousand grains of the powdered root were moistened with a small quantity of alcohol, 85 per cent., packed firmly into a glass funnel and covered with a disc of filtering paper. Alcohol, of the same strength, was then poured on from time to time, until the percolate measured three pints, having passed very slowly, when the powder seemed to be thoroughly exhausted. The first ten fluid ounces of the tincture were kept separate. This was a syrupy liquid of a dark brown hue. The remaining tincture was then evaporated to one pint and mixed with the first liquid, when the whole was carefully evaporated by means of a water-bath to the proper consistence. The result was four hundred and twenty grains, a yield of twenty-one per cent. of resin of the Edinburgh Pharmacopœia.

C. Two hundred grains of the resin of jalap placed in a flask were treated successively with ether and boiling ether. The solutions were then mixed; the ethereal tincture had a strong jalapy odor and taste, and was of a light reddish brown color, and yielded, on evaporation, sixty-five grains of the ethereal or soft resin. The residue in the flask, which was supposed to be the hard resin in combination with coloring matter, was then treated with several portions of alcohol, 95 per cent., both cold and hot, but was found to be only sparingly soluble in that



menstruum, entirely soluble in diluted alcohol and boiling water. The result of this experiment seeming somewhat singular, as a test for its accuracy the following experiment was made :

One hundred grains of the medicinal resin, carefully prepared on a previous occasion, were treated in the same manner, and the result corresponded precisely with that of the above experiment.

The aqueous or gummy extract, prepared by the process given in experiment A, was therapeutically tested. Having been taken in doses ranging from ten to twenty grains, a final trial was given it. One drachm divided into two doses was administered, one at night just before retiring, the other the next morning before breakfast, without producing the least effect. It therefore may be, with safety, considered entirely inert.

The experiments made with the soft resin—the resin soluble in ether—lead me to differ from the opinion entertained by most writers on *Materia Medica*, viz., “that this resin possesses little, if any, activity.” Three grains of this soft resin were taken by a person suffering from constipation; it acted as a hydragogue cathartic, three hours after it had been administered, producing but little uneasiness, and continuing in its operation for more than twenty-four hours. That there might be no doubt as to the correctness of this experiment, it was tried by another person in the same dose. Three grains in form of a pill were administered at bed-time, and produced, the following day, a powerful cathartic effect, accompanied with severe griping.

These experiments, which were made with great care, (and in every case where there was the least room for doubt, a second experiment was instituted,) determine conclusively that the gummy or aqueous extract is entirely inert, and that the activity of jalap as a purgative is not due to the hard resin (that which is insoluble in ether) exclusively, but also to the ethereal or soft resin, which is fully equal to, if not possessed of, stronger purgative properties.

*Philadelphia, Nov. 24th, 1860.*

## ON THE BARK OF EUONYMUS ATROPURPUREUS.

By WILLIAM P. CLOTHIER.

(Extracted from an Inaugural Essay.)

The plant producing this bark is a small tree or shrub, tall and upright, leaves petioled, oval, oblong, pointed; the flowers commonly in fours; sepals 4 or 5, united at the base, forming a short and flat calyx; petals 4-5 rounding, spreading; stamens very short, inserted on the upper face of a broad and flat, 4 to 5-angled disk, which coheres with the calyx and is stretched over the ovary. Style short or none. Pods 3 to 5-lobed, 3 to 5-valved, smooth. Seeds one to two in each cell, enclosed in a red aril. The leaves are serrate, and the flowers, which are in loose axillary cymes, are of a dark purple color.



At the close of Autumn this tree is conspicuous and ornamental from its clusters of crimson fruit. Though frequently

met with in gardens, it is more abundant as an indigenous product in the Western States. Its local names are *wahoo*, *spindle tree*, and *burning bush*.

The bark was introduced to notice by the late George W. Carpenter, of this city, as a remedy for dropsy, for which purpose it had been employed in the West. The infusion, made an ounce to the pint, is used in wineglassful doses for dropsy. A fluid extract has also acquired some celebrity, and the "Eclectic" practitioners employ a resinoid product of the bark under the name of "Euonymine" as a tonic, cathartic and alterative. The taste of the bark is intensely bitter and persistent. The bark was subjected to a partial qualitative examination with the following results:—

The cold infusion contains much *gummy matter*, but is not coagulated by heat, nor is it affected by the liquid tests for albumen. *Starch*, however, is present; but neither sesquichloride of iron, gelatin, or a solution of quinia give any indication of tannic or gallic acids.

The decoction, when subjected to Trommer's test for grape sugar afforded evidence of the presence of that substance as a constituent of the bark.

The bark, after exhaustion by diluted alcohol, yielded *pectin* or *pectic acid* to an alkaline solution of carbonate of soda, from which, by the addition of hydrochloric acid it was precipitated.

The bark in powder was treated by percolation with alcohol, sp. gr., .835, the tincture evaporated to a syrupy consistence, and thrown into water. An oleo-resinous matter precipitated consisting of resin, fixed oil and fatty matter, and which possessed a dark yellow color and bitter taste. This is the so-called "Euonymine" of the Eclectics. Six grains were taken at a dose, and in a few hours brisk purgation was produced, without any attendant griping effect; its action resembles that of castor oil.

When the tincture of the bark, made with diluted alcohol, is agitated with chloroform, and the chloroformic liquid separated and evaporated spontaneously, a small product of yellow acicular crystals is obtained. These are bitter, soluble in chloroform and boiling alcohol, which deposits them on cooling. The solution of this substance is neutral to test paper. It was ob-

tained in so small a quantity that its other properties were not investigated.

When the powdered bark is treated with ether, the tincture yields by evaporation a resinous matter, which, when taken internally, had no perceptible action analogous to the alcoholic resin.

The bark, when distilled with water, yields a transparent distillate without a trace of volatile oil.

The aqueous extract of wahoo bark is black, intensely bitter and contains much extractive matter. Diluted alcohol is the best menstruum for exhausting this bark in preparing from it a fluid extract. This preparation should be of the strength of an ounce to the fluid ounce, and may be given as a purgative in tablespoonful doses, and as a tonic in teaspoonful doses.

---

#### ON ASCLEPIAS TUBEROSA (PLEURISY ROOT.)

By ELAM RHODES.

(Extracted from an Inaugural Essay.)

The Butterfly weed, or pleurisy root as it is frequently called, is a perennial plant indigenous to the United States, but more abundant south than north. The root is an official of the U. S. Pharmacopœia. It is a large, irregularly tuberous, often branching, somewhat fleshy root, externally brown, internally white and striated, and in the recent state of a subacid, nauseous taste. When dried, its taste is bitter but not unpleasant.

It was subjected to a chemical examination; the infusion, obtained by percolation was blackened by a sesquisalt of iron, and was precipitated by solution of morphia and by solution of gelatin; and when exhausted by the latter, the filtered solution yielded a black coloration with sesquichloride of iron, which was discharged by heat—indicating the presence of *tannic* and *gallic* acids. The cold infusion was precipitated by infusion of galls and by corrosive sublimate, and when boiled was rendered cloudy, indicative of *albumen*.

The percolate obtained from the root by an alkaline solution afforded a gelatinous precipitate of pectin when saturated with dilute sulphuric acid.



A decoction, when allowed to cool, gave evidence of being strongly charged with *starch*, when tested by iodine; and the presence of *gum* was determined by appropriate tests.

The ligneous portion of the root, when freed from other matters by solvents, amounted to from 80 to 85 per cent. of its weight.

The ethereal extract is a brownish yellow mixture of resin, fixed oil and coloring matter. The root after exhaustion by ether affords to alcohol a resin not soluble in ether.

When the syrupy alcoholic extract of the root is thrown into water and allowed to stand, an oleaginous yellow colored matter rises to the surface; no precipitate of consequence occurs. By evaporation an extract is obtained, which forms a cloudy homogeneous mixture with water possessed the taste of the root, and appeared to retain fixed oil and resin in intimate mixture in suspension.

Repeated distillation of the root afforded no volatile oil, but the distilled water was odorous of the root, and the receiver was contaminated with a solid substance. This, when removed by ether, and the latter evaporated, appeared to be a volatile, fatty, odorous substance.

The drug appears to contain a peculiar principle precipitable by tannic acid. The concentrated cold infusion was treated with tannic acid till reaction ceased, and the precipitate was collected, washed, pressed, and mixed with an excess of litharge and dried. This, when exhausted with hot alcohol, decolorized and evaporated, yielded a small quantity of a yellowish white powder, possessing the peculiar taste of the root, soluble in ether, much less soluble in water, and precipitable by tannic acid.

The root also contains much extractive matter. The ashes of the root afforded potassa, soda, sulphuric acid, lime, oxide of iron, magnesia and oxide of manganese.

*Medical Properties.*—The pleurisy root is stated to be diaphoretic and expectorant, without being stimulant. It has been considerably employed in medicine as a remedy in pleurisy, pneumonia, catarrh, and other pectoral affections, and its popular name has arisen from this use. It has also been employed in febrile diseases, acute and chronic rheumatism, diarrhoea and dysentery. It appears in large doses to be mildly cathartic.

Being desirous of having its merit tested therapeutically, a

fluid extract was prepared by the following formula, similar to one of those given at page 532, vol. xxxi. of the Amer. Journal of Pharmacy.

Take of Pleurisy root, in Powder No. 50, sixteen ounces ;

Alcohol, three pints ;

Water, a pint and a half.

Mix the alcohol and water, and having moistened the powder with four fluid ounces of it, pack it in a glass funnel prepared for percolation, and pour on the remainder of the menstruum, reserving the first twelve fluid ounces. After the liquor ceases to pass, evaporate the remainder in a water bath to four fluid ounces and mix it with the reserved tincture, and filter after standing 24 hours.

Prepared in this way the fluid extract is an elegant preparation fairly representing the root. The author submitted this fluid extract to several of his medical friends, and among others to Dr. H. D. W. Pawling, of Norristown, whose report is inserted in full.

*Report of Dr. Pawling.*

" Case 1st. Mrs. Mary Anderson, aged fifty-four, (habit plethoric, mode of living regular), was attacked with inflammatory rheumatism, on the 29th of January last. Previous to my visit she had purged herself freely with senna and salts. Her ankles, knees and wrists were much swollen, and exceedingly painful; her pulse full and bounding. I directed her to repeat the purge, and then to use the fluid extract of *Asclepias tuberosa* in teaspoonful doses, every two hours, until it reduced the action of the heart and acted well on the skin. Fomentations of cloths wrung out in hot water were applied to the swollen joints. Using this remedy for twenty hours, I found on my second visit it had not acted as I wished, and as the method was somewhat experimental (though a tea made from the weed is a common remedy with the country people for the purpose of sweating), I was inclined to continue in the same plan, increasing the dose. I therefore ordered two teaspoonsful to be used every second hour, mixed in a wine-glassful of hot water, sweetened. After using it in this dose for a few hours, the pulse was reduced in its action, free perspiration was brought about, and her whole condition rendered more comfortable. The dose was then diminished one half again, and the system kept under the action of the remedy, by a repetition every fourth hour, until complete convalescence was established.

" The action of the remedy in this case gave me great satisfaction. No opiates or blister were resorted to.

" Case 2d. Robert Brown, aged 28, stature small, habit plethoric, miner by occupation, was attacked January 30th, with lumbago—rheumatism of the loins. On my first visit, I found him unable to move without exceeding pain,—pulse full and bounding. Bled to the extent of 20 oz., and, owing to his inability to assist himself, omitted a purge. Commenced the use of the *Asclepias tuberosa* in two teaspoonful doses every two hours, mixed in a wineglassful of hot water; together with mustard poultices to the back. On my next visit, after an absence of twenty-four hours, I found his condition more comfortable; better able to move. Cupped his back. Gave a purge of senna and salts; continued the use of the *Asclepias* in one teaspoonful every second hour; no opiates. On my next visit the pulse was natural; pain nearly gone. Directed the *Asclepias* to be given one teaspoonful every fourth hour. His recovery was rapid. No unpleasant symptoms from the use of the remedy. In this case the perspiration was profuse, and the skin continued to act as long as the remedy was in use.

" Case 3d. Mr. John Morgan, aged fifty; farmer by occupation, habits good, temperament sanguine; was attacked on the 31st of January with violent pain in his head, accompanied with rigors and vomiting. The pain in his head was intense. Visited him at midnight; his pulse was strong and full; no general fever. Bled to the extent of producing syncope. Ordered calomel grs. xv., jalap grs. x., gamboge gr. j., to be followed by senna and salts in four hours. Visited again in the morning; medicine had operated and was still acting; head somewhat relieved, but still acutely painful; pulse not so active; eyes bloodshot. Ordered cups to nape of neck, blisters to extremities, and to take the *Asclepias*, in teaspoonful doses, every hour for six hours. Ice applied to head. Visited again that day; no relief; blisters not yet filled. Ice continued to head; remedy continued. On my next, found some improvement; skin moist; pulse soft; head cooler eyes not so much injected, but some delirium. Reapplied cups; blisters acted well; some nausea, attributed to the *Asclepias*. Discontinued its frequency, and gave two teaspoonfuls every third hour. From this time he continued to mend, and had a rapid recovery. I think the *Asclepias* has a decided effect in reducing the circulation, and producing perspiration.

" Case 4th. Mr. Dorr, aged 45, sober, married, temperament sanguine, was attacked with pneumonia on the 1st day of February last. On my visit to him I found him breathing with difficulty, crying out with each effort to inflate the lungs; pulse quick and corded; bloody expectoration; cough incessant. Bled freely to the amount of 24 oz.; cupped between the shoulders. Bowels have been freely moved with castor oil; blister applied to the right lung. Ordered the *Asclepias* in teaspoonful doses, with the addition of  $\frac{1}{2}$  gr. tartarized antimony, and  $\frac{1}{2}$  gr. acetate morphia, every third hour. 2d of February: condition not much improved; reapplied

cups; blister drew well; applied savinè ointment. Expectorates still bloody, gummy mucous; pain not so great; cannot lie down. Increased the Asclepias to two teaspoonsful, other additions the same, time the same. 3d. Condition improving, remedies continued, 4th. Condition still improving; pulse soft; skin moist, tongue clean; cough soft; no bloody matter. 5th. Bowels constipated; ordered castor oil ʒij.; continued Asclepias, omitting tartaremetic; addition of morphia still continued. 6th. Still improving, breathes freely expectorates freely. Discontinued morphia addition, diminishing Asclepias to teaspoonful, time the same. So he continued to improve until convalescence was finally established.

*Remarks.*—As far as my experience permits a judgment on this preparation of *Asclepias tuberosa*, furnished by you for my use, in these experiments, and some others in which I have used it, I am satisfied it has a powerful effect in reducing the circulation, and acting promptly on the skin; but the dose required should be large, and frequently repeated until the skin begins to act. In active inflammatory cases, the two teaspoonsful of your preparation, repeated at intervals of two hours, in every case in which I have used it, acted promptly, reducing the volume as well as the activity of the pulse, and invariably producing profuse copious perspiration, which can be regulated afterwards by diminishing the dose, and adding to the time."

---

#### ON THE CHEMICAL CONSTITUENTS OF COCA LEAVES.

By JNO. M. MAISCH.

These interesting leaves are beginning to attract considerable attention both in Europe and America; the accounts of learned travellers and of physicians, who have lived for a number of years in the districts where *Erythroxylon coca* is cultivated, and where the leaves are employed for the preservation of the bodily strength amid continued hardships, all these accounts agreeing in the main points, it was natural to expect that the reflecting physician would desire to investigate their adaptation for the cure of disease. The greatest drawback to such investigations is undoubtedly the limited supply of the leaves, but I believe a sufficient quantity might be found in the United States for experiments in our hospitals.

Several papers have within the last year found their way into the scientific journals of America; among these an analysis of the leaves performed by Dr. A. Niemann on page 122, of the present volume of this journal. The principal object of his in-



vestigations was to search for an alkaloid, which he separated in a pure state and analyzed. The wax and tannin were separated incidentally in the process for liberating the alkaloid, so that we are still in the dark about its other constituents.

A few months ago, I obtained through the kindness of Professor Procter, a few ounces of coca leaves for the purpose of analyzing them. I should have desired very much to pay attention likewise to those constituents which are probably of less importance in regard to their medical properties, but at all events I had to follow the course marked out by Dr. Niemann, so as not to lose the opportunity of obtaining a little of the new alkaloid, and study the other substances isolated by him.

Accordingly, 1500 grains of the coarsely powdered leaves were exhausted in a funnel-displacer by alcohol mixed with a little sulphuric acid. The dark colored brown-green tincture was agitated with an excess of milk of lime, which assumed a brownish-green color; the filtrate therefrom, together with the washings with cold alcohol, was carefully neutralized with sulphuric acid, filtered from the greenish sulphate of lime and distilled. The aqueous residue separated but little resinous matter, the filtrate therefrom was precipitated by carbonate of soda and the alkaloid gained in an impure state by shaking the mixture with ether and evaporating the light straw-colored ethereal solution. The yield was 4 grains, and the alkaloid showed the behaviour described on pages 123 and 124.

On adding the milk of lime to the acid tincture, the peculiar tea-like odor of the leaves was strongly developed; but on the addition of the carbonate of soda another heavy and narcotic odor is observed; this is described by MacLagan and Niemann as reminding of nicotina. I observed this slight resemblance, but still the odor is very different.

I likewise found Dr. Niemann's statements correct regarding the vegetable wax and the tannin; though, owing to the small quantity operated on, I was unable to obtain the former in a snow-white condition. The second acid, which Niemann considers as tannin modified by nitric acid, I obtained also in solution contaminated with some of the latter acid.

The alkaloids of coffee and cacao, which, though in a less degree, possess properties similar to those of coca, contain

more nitrogen than any other alkaloid known. The small percentage of nitrogen ascertained in cocaina by Dr. Niemann, suggested the idea that it might probably be a product of decomposition, and that the odor developed by carbonate of soda, might perhaps be a nitrogenous body or another alkaloid. To ascertain this, and to find out whether one or two acids were contained in the tincture, the above process was repeated with the balance of leaves, weighing less than an ounce. The liquid, together with the precipitate occasioned by carbonate of soda, was introduced into a retort, the neck of which was connected with a bent glass tube, dipping into a little dilute muriatic acid. When heated over the spirit lamp, the concussions were so violent that it was deemed advisable to place the retort in a sand bath, so as to supply from the sides sufficient heat to distil the volatile substances, until a syrupy liquid remained behind, from which the alkaloid was separated by ether.

The muriatic acid, which was perfectly clear and colorless, now had an odor somewhat different from the original odor of the alkaline liquid, but it resembled that of the residue in the retort. The acid solution was rendered alkaline by carbonate of soda and agitated with ether, which took up the odorous principle leaving it behind on spontaneous evaporation as a soft resin-like coating. The odor of this mass is heavy, narcotic, the taste similar, somewhat acrid; the behaviour to test paper, neutral, but exposed to the damp atmosphere of a rainy day, it had almost completely lost its odor and acquired an acid reaction and taste, and was now easily soluble in water and alcohol; the solubility of the odorous mass in these menstrua had not been tried. I omitted to mention that the hydrochloric acid solution was tested with the usual reagents for alkaloids: phosphomolybdic acid, and the chlorides of gold, mercury and platinum, without being disturbed by either.

This odorous principle which I regard as a product of decomposition of some constituent, is therefore volatile with the vapors of water in a slight degree, but very changeable at least in a moist atmosphere. It is likely to be of great importance, as it is stated by several observers that an infusion of the leaves has different properties from the same leaves chewed with an alkali. Whether or not it is nitrogenous, must at present be left undecided.

The solution from which the alkaloid had been removed by ether, was digested with precipitated carbonate of baryta, which removed all the sulphuric acid, and acquired a pale greyish white color. The filtrate was neutralized with acetic acid, and after the expulsion of the carbonic acid, rendered very slightly alkaline by a few drops of liquor ammoniæ. An aqueous solution of neutral acetate of lead was now carefully dropped in, as long as a dirty greenish brown precipitate was produced, which is voluminous, but settles in a few minutes and may be readily filtered and washed. On the further addition of neutral acetate of lead a precipitate is separated which is at first yellowish white, but settles readily to a greyish yellow.

The liquid filtered from this last precipitate, is not disturbed on the further addition of sugar of lead, but yields with basic acetate of lead a nearly white voluminous precipitate which is insoluble in water, but readily soluble in acids. Corrosive sublimate and deutonitrate of mercury do not disturb it; protonitrate of mercury yields a whitish precipitate, insoluble in water, almost entirely soluble in nitric acid; the white precipitate by nitrate of silver is scarcely taken up by nitric acid, but readily by ammonia. The liquid contains a small quantity of muriatic acid, but besides it an organic acid which imparts to it a brownish yellow color. This color becomes deeper on exposure to the air, and after 24 hours standing, neutral acetate of lead produces a precipitate which resembles in color the yellowish white precipitate spoken of before. The filtrate was now of a pale yellow color and was not further disturbed by acetate or subacetate of lead after exposure to the air.

The first of the above-mentioned lead compounds dried to a dirty yellowish brown powder; the second to a powder of a similar, but lighter color.

The alkaloid which had been separated by ether from the alkaline solution left behind in the retort, was obtained as a transparent mass of the consistence of balsam tolu, a somewhat lighter color, and of a heavy narcotic odor. All attempts to crystallize it failed, but it had still an alkaline reaction to test paper, was insoluble in water, but soluble in acids, which it completely neutralized. The solution in hydrochloric acid yielded with alkalis and their carbonates a white precipitate

soluble in ammonia, with phosphomolybdic acid a voluminous yellowish white, with bichloride of platinum a yellowish grey, with terchloride of gold a bright yellow, with bichloride of mercury a voluminous white, afterwards flocculent, with iodine an orange brown precipitate; no coloration was produced by this alkaloid with oxidizing agents.

It will be seen from these experiments that this uncrystallizable alkaloid had very nearly the same behaviour as pure cocaina, the principal difference being the reaction with iodine, which with the former is of a somewhat lighter color with a slight yellow tinge. Heat, it appears, therefore, renders it amorphous; what part the water and carbonate of soda take in this change must be determined by experiments with the pure alkaloid. But it is very likely that the yellowish brown matter, which Dr. Niemann found so difficult to separate from cocaina, is this same alkaloid in an amorphous state.

My experiments likewise render it more than probable, that the substance named cocatannic acid by Dr. Niemann, is a product of oxidation, the original compound of which yields with acetate of lead from a slightly ammoniacal solution no precipitate, but after previous oxidation by the atmosphere, precipitates it, and the precipitate has, according to the length of exposure, a color varying from white to yellow and brown. As it is so readily affected by the atmospheric oxygen, great care is necessary in its separation from the other constituents.

*Philadelphia, Sept. 1861.*

---

#### GLEANINGS—MISCELLANEOUS.

*Tubular Condenser.*—Mr. Thomas Keates, of London, exhibited, at the April meeting of the Pharmaceutical Society, a tabular condenser, possessed of great effectiveness. It consists of a tinned copper cylinder, three feet long and eight inches in diameter, divided into three apartments by two diaphragms placed about four inches from either end. The upper and lower chambers are connected by about twelve tinned copper tubes half an inch in diameter, smoothly soldered in above and dipping half an inch into the lower chamber. The middle chamber



has two openings, one below for the ingress of the refrigerating water, and one above for the escape of the heated water. The upper space has two openings, one central and vertical and one lateral and inclined, for the ingress of the vapor, so as to accommodate a vertical or inclined tube connecting it with the still or boiler. The lower apartment has one lateral opening for the escape of the condensed vapor.

It will be perceived that this instrument is really a compound Liebig's condenser, and, if a constant and sufficient current of cool water circulates through it, that its condensing power is very effective, and readily serves a fifteen gallon still. By making the lower chamber separate, so as to slip over the central one at the lower diaphragm, it may be removed at will, and the tubes cleaned with a swab, after operations with odorous liquids.—(Pharm. Journ.)

*The Artificial Production of Ice.*—M. Carré has recently communicated to the French Academy a means of producing low temperatures upon a large scale, which are simple and not very expensive, depending on the rapid evaporation of liquified ammoniacal gas. The apparatus consists of two ordinary cylindrical boilers, one having four times the capacity of the other, the larger one being three-fourths filled with the strongest solution of ammonia. The two boilers are connected by a tube provided with a stopcock. Before closing the apparatus the whole of the air is driven out. Heat is then applied to the larger vessel until the solution acquires the temperature of  $130^{\circ}$  to  $140^{\circ}$ , the cock being open. Under these circumstances the ammoniacal gas, disengaged from the solution, having no means of escape, condenses in the small boiler in a liquid form under the great pressure. When it ceases to increase, the cock is closed and the large boiler cooled. The apparatus then contains liquid ammonia in one vessel and cold water with a vacuum above in the other. The small boiler is surrounded with cold water and the tap opened, when the rapid evaporation of the condensed gas abstracts so much heat from the water through the boiler as to freeze the water surrounding it. The ice thus formed is then removed and the operation repeated. It is necessary that the apparatus be absolutely tight and capable

of bearing a pressure of at least ten atmospheres, (150 lbs. to the square inch.) The temperature of the ammonia sinks to 40 degrees below zero.—(Pharm. Journ., Aug. 1861.)

*Native Nitrate of Soda.*—One of the British Consuls in Brazil reports that, in the neighborhood of the river San Francisco, in Bahia, Brazil, at a place called "Salitre," large deposits of nitrate of soda exist. In the words of a distinguished Brazilian, it is found through a valley of from 16 to 20 leagues in extent; in some places on the surface, at others a few feet under, in masses, and is sufficiently abundant to yield a supply for exportation for years to come. On the opposite side of the San Francisco river, near the town of Pilao Arcado, other equally large deposits exist. The projected Bahia railroad to the town of Joazeiro must pass through the first named district at a distance from the coast of 240 miles.—(Chem. News, Aug. 17, p. 98.)

*Paraffin as a Lubricant for Alkaline Solution Bottles.*—The constant difficulty arising from the fixing of the stoppers of caustic potash solution bottles may be avoided by dipping the stoppers in melted paraffin, upon which substance the alkali has no action, and which acts as a lubricant.—(Chem. News and Polyt. Notizblatt.)

*Salisburia adiantifolia, or Ginkgo Tree.*—Daniel Hanbury, in his elaborate notes on Chinese Materia Medica, (Pharm. Jour., May, 1861,) says that the fruit of this tree is called *Pih-kwo* and *Yin-hang* (silver almond) in China. "These are nut-like, oval, pointed seeds from half an inch to an inch long, keeled lengthwise on two sides, and having a smooth, fragile, bony, pale brown, outer shell or testa. The nucleus of the seed consists of amylaceous albumen enclosing a pair of long narrow cotyledons, the whole enveloped in a delicate reddish brown membrane.

"*Salisburia adiantifolia* is commonly cultivated both in China and Japan, where it attains a large size. The male plant was introduced about a century and a half ago, the female much more recently. The tree is not uncommon in gardens; and in the warmer parts of the Continent it ripens its handsome plum-

like yellow fruit perfectly. Kæmpfer says the seeds are eaten to promote digestion. The pulp, which has a penetrating, offensive smell of butyric acid, has been chemically examined by Dr. Schwartzbach, who has extracted from it by means of ether a peculiar crystallizable fatty acid, which has been named *Gingkoic acid*, and which has the composition  $C_{45}H_{47}O_3 + HO$ . *Gingkoic acid* forms tufts of acicular crystals, which have not been obtained colorless, but are of a brownish yellow; it is easily soluble in alcohol or ether, and exhibits in either case a strong acid reaction. It fuses at  $95^{\circ}$  F. and congeals at  $50^{\circ}$ . Heated with solution of potassa it forms a soap-like compound. The other constituents of the pulp are pectin, gum, glucose, citric acid and chlorophylle." This tree was introduced into the United States about 1780, but so far as we know only the male tree was found here.

*Cod-liver Pills*.—Under this name a complex compound purporting to be an extract embracing the active principles of cod-liver oil is sold. The following analysis of this substance, made by Dr. Garreau, of Lille, for the Academy of Medicine, is found in the Chemist and Druggist, June 15, 1861, viz. :—

Ichthy-glycine—hepatic, glocozen and azotized products,.....	50.000
Acetic, lactic and butyric acids,.....	6.000
Phosphoric acid,.....	2.090
Sulphuric acid,.....	0.200
Chlorine,.....	1.525
Iodine,.....	0.054
Bromine.....	trace,
Soda,.....	1.170
Potash,.....	0.211
Magnesia,.....	0.366
Lime,.....	0.510
Propylamin,.....	2.545
Ammonia,.....	2.862
Extractive matter undetermined, gaduin, &c.,.....	10.620
Water,.....	21.847
	<hr/>
	100.000

This extract appears to be made by M. Despinoy, of Lille, in France, and professes to possess more curative power than cod-

liver oil. As a difference of opinion exists in regard to cod-liver oil, as to whether it is the pure oil or the associated ingredients that are curative, it should not be hastily assumed that this extract is medicinally valuable.

*Ailanthus glandulosa*.—Alonzo Lilly, Jr., in a thesis presented to the Maryland College of Pharmacy last spring, states the following to be the constituents of the bark and leaves of this tree:—

*Bark*.—Starch, tannin, albumen, gum, sugar, oleoresin and a trace of volatile oil, potassa, phosphoric acid, sulphuric acid, iron, lime and magnesia.

*Leaves*.—The same organic ingredients with the addition of pectin and chlorophylle, and minus lime and phosphoric acid.—(Journ. and Trans. Md. Coll. Ph.)

*Soluble Salts of Copper, Lead and Tin in newly distilled Spirits*.—Dr. A. A. Hayes, of Boston, expresses his conviction that strychnia and analogous bodies are not used as agents to adulterate spirits, as has been alleged, both from his chemical researches and the testimony of parties most likely to know if such was practised. But whilst dismissing this bugbear, Dr. Hayes points out a source of danger not thought of, derived from the organic acids of the impure spirit, and the metals of the still. "The quantity of copper contained in the bulk usually taken at a draught is sufficient to produce the minor effects of poisoning. The cumulative character of these poisons may even lead to fatal consequences. Dr. Hayes believes that all new spirit is liable to these contaminations, but that all of them lose it by age, the metallic oxides being precipitated in some form in the vessels in which the liquors are kept. Hence, in the process called "ripening," at least one cause of the changed character of the liquor may be due to this cause. The particular acids which occasion the difficulty are chiefly acetic and butyric, but probably valerianic and succinic acids may be concerned, as those acids are more or less present in the fermenting vats.—(Amer. Journ. Science and Arts, July, 1861.)

*The Cork Trade of Bordeaux*.—There are at present in Bordeaux 25 cork factories, employing 75 workmen, using an-



nually 3,396,846 lbs. of cork bark, and producing about 10,000,000 corks. 90,000,000 ready made corks are obtained from the neighboring places of Nesac, Bayonne, and Provence. The cork trade of Bordeaux, therefore, may be estimated at 100,000,000 corks annually, worth about £156,338. Two-fifths of this quantity are exported to the French colonies, the United States, Chili, India, &c., and three-fifths are used in Bordeaux, at the average price of £1 4s. per thousand.—(Newspaper.)

*Grand Surgical Prize of the French Academy.*—This is for the preservation of limbs by preserving the periosteum. The prize is 20,000 francs to be awarded, if occasion offers, in 1866. The following extract explains the object of the Academy:—

Numerous facts have proved that the periosteum has the power of producing bone. Recently some remarkable facts in human surgery have shown that very extended portions of bone have been reproduced by the periosteum which remained. The time appears to have arrived to call the attention of surgeons to this great and novel study, which is interesting at once to science and humanity. The Academy made the prize 10,000 francs, to which the Emperor added as much more.—(Silliman's Journal, July, 1861, page 95-99.)

#### ON THE BARK OF CEDRELA FEBRIFUGA, BLUME.

By DR. F. A. FLÜCKIGER.

The author gives the following description of this bark derived from a tree, belonging to *Hesperidææ-Cedreleæ*:

Pieces  $\frac{1}{2}$  metre in length, .05 to .06 m. in width and 4 to 5 millim. in thickness, either freed from or covered with the outer bark, the latter resembling that of pine. The surface, where the outer bark is wanting, is of a rusty color, partly covered with secondary cork, and marked with impressions like the so-called *conchas* of cinchona barks.

Inner surface light brown; smooth, fibrous; fracture tough, long fibrous. Without a magnifier, several layers of periderma are seen, covering a very dense red brown parenchyma, intersected by medullary rays. Under the microscope, the periderma

appears to be composed of several alternating layers of cork and parenchyma cells, and is therefore a true rhytidoma. The last mentioned cells are filled with brown coloring matter; they are more roundish in the secondary parenchyma, thin-walled, intermixed with many small groups of bast cells.

The innermost corky layer is followed by a few thick-walled porous cells, filled with a brown resin or coloring matter, and by the inner parenchyma; consisting of uniform somewhat tangentially elongated cells, which are likewise filled with brown coloring matter. The outer layer of this portion contains but few bast cells; in the inner layer, however, rows of such cells alternate with parenchymatous strata. These several layers are separated by dark brown lines, probably intercellular matter, which are produced by the one-sided thickening of the walls of a whole row of parenchyma cells. The contexture is again radially divided by numerous light large-celled medullary rays, so that the whole inner bark appears to be divided into rectangular fields, which are tangentially elongated, and may be recognized by the magnifying glass.

The bark is free from starch, but it is interspersed with numerous rosettes of crystals of oxalate of lime, precisely like the roots of rheum, viola, fragaria, vincetoxicum, cortex canellæ albæ and many other drugs.

The longitudinal tangential section shows the very long bast cells, the apparently elongated parenchyma cells, and the crystals in rows in the interstices.

The whole anatomical structure of Cedrela bark reminds of cinchona, and approaches Loxa bark probably nearer than any other, though they may be readily distinguished by external signs. The difference in their anatomy is as follows:

Cedrela bark wants a resin ring, observable with the naked eye, though resin cells are present; starch is likewise wanting. Instead of the crystal cells of the cinchona barks, containing single crystals, Cedrela bark has them always in cavities. The bast cells resemble those of the cinchonas very much, but are invariably much thinner, longer; less plainly arranged in layers and rarely with porous canals. The cross-section shows the bast cells roundish, not angular like those of cinchona, and either with very little lumen or entirely closed. While their diameter

is 1-50th or to the utmost 1-80th millimetre, the smallest bast cells of *Loxa* bark have 1-20th to 1-12th, other kinds, *Cuscuta*, for instance, even 1-6th m. m. in diameter. The texture of *Cedrela* is in general smaller-celled and less elongated, as compared with *cinchona*; but the cells of the liber are a good deal longer. Another marked difference is in the arrangement of these cells, which in *Cedrela* are placed in rows by bundles, while in *cinchona* they are irregularly interspersed.—(Schweiz. Zeitsch. vi. 125—127.) J. M. M.

---

ON THE BARK OF MILLINGTONIA HORTENSIS, LIN. FIL.,  
BIGNONIACEÆ.

By Dr. H. HOLLANDT.

The bark which was obtained from Dr. A. Flückiger, and which is highly esteemed in Java as a febrifuge, consists of quills,  $1\frac{1}{2}$  feet in length and  $1\frac{1}{2}$  lines thick. The external corky portion is  $1\frac{1}{2}$  times thicker, and may be readily separated in small pieces from the internal portion. The surface is of a brownish yellow color, and longitudinally irregularly fissured. The fissures frequently show on their margin different layers, indicated by darker and lighter stripes. Transverse fissures are not frequent and always short. The last is tough, fibrous, and may be separated lengthwise in lamellæ. The inner surface is smooth and of a lighter or darker cinnamon color. The parenchyma of the primary bark adheres closely to the bast as a thin brown layer of a resinous lustre, which may be readily removed from the corky portion.

The taste is rather insipid, mucilaginous, not bitter. The bark is inodorous, but the reddish-brown powder has in large quantities a somewhat musty odor, reminding faintly of *cinchona*.

Under the microscope the corky layer shows long rows of radial cells, with wavy walls, to which are joined the somewhat compressed and tabular cells of the external parenchyma of the primary bark, exhibiting upon a tangential section, hexagonal tables, with moderately thick walls and superficial dots, the angle of the hexagon never, but always one of its sides lying upwards and downwards. The middle parenchyma or collen-

chyma is irregularly developed, and consists of three or four cells, varying between the hexagonal tabular and rectangular prismatic form, and with the walls thicker towards the corners. The inner parenchyma is composed of tangentially arranged oval cells, frequently separated by a wall of later growth in a radial position, the cells filled with chlorophyll.

The confines of the primary and secondary bark are marked by larger bundles of the bast cells. The whole secondary bark is composed of two kinds of cells, with thick and thin walls, interlined with medullary rays and alternating with each other. The thick-walled cells are prosenchymatous and have but little lumen; they are surrounded by thin-walled, short-celled bast parenchyma, and interspersed with peculiar shaped cells, containing starch. All parts of the bark with the exception of the starch and prosenchymatous cells, contain short prismatic crystals of oxalate of lime.

*Chemical analysis of the Bark.*—The ethereal extract was treated with water, which dissolved a little of a neutral bitter principle, and a tannic acid, yielding with sesquisalts of iron an olive green color; the portion left undissolved by water consisted chiefly of wax with traces of fixed oil and some olive green coloring matter.

An alcoholic extract was prepared from the bark extracted by ether, and treated with water which dissolved sugar; after destroying it by fermentation, the liquid left on evaporation a brown, shining, brittle mass, which the author considers as chiefly gum or dextrine. The portion not taken up by water was a mixture of wax, resin and coloring matter, probably also traces of fat.

Cold water now dissolved from the bark a minute trace of chlorophyll, some phosphoric acid, a humic acid and dextrine-like gum.

The bark was now boiled with water, and the decoction filtered after cooling. The filtrate contained phosphoric acid, another humic acid, sugar, lime, dextrine-like gum, and some tannin.

The residuary bark yielded to diluted hydrochloric acid, pectine, and oxalate of lime.

The aqueous distillate of the bark was found to be free of any



volatile body. The liquid in the still was precipitated with acetate of lead, and the precipitate treated with acetic acid; the two lead compounds thus obtained contain new humic acids, probably derived from the tannin, and have the composition  $4\text{PbO}$ ,  $\text{C}_{34}\text{H}_{28}\text{O}_{26}$  and  $3\text{PbO}$ ,  $\text{C}_{44}\text{H}_{27}\text{O}_{26}$ .

The air dry bark yielded 8.7 pr. ct., the anhydrous bark 10 per cent. ashes which consisted of  $\text{KO}$  27.23,  $\text{NaO}$  .67,  $\text{NaCl}$  .16,  $\text{CaO}$  25.32,  $\text{MgO}$  5.62,  $\text{Al}_2\text{O}_3$  1.20,  $\text{Fe}_2\text{O}_3$  .95,  $\text{SO}_3$  .71,  $\text{PO}_5$  3.86,  $\text{SiO}_3$  6.31,  $\text{CO}_2$  27.97.

It is evident that the composition of this bark does not coincide with its high reputation.—(*Wittstein's V. Schr.* x. 321–342.)

## ON THE COLOR OF WATER.

By PROFESSOR WITTSTEIN.

Pure water, according to Bunsen, has a blue color, while additions of other bodies, or the reflection from a colored bottom, cause the color to appear differently. This can be verified by looking at white objects upon a white surface through a column of water, 2 metres in height, or by allowing the sunlight to shine upon these objects after it has passed through such a column of water.—(*Ann. der Chem. und Ph.* lxxii. 44.)

Dr. G. C. Wittstein discusses the causes of the different colors of natural water, and cites analyses performed by himself and others, of the water of several rivers in Bavaria, from which he arrives at the following conclusions:

1. Pure water is not colorless, but blue.
2. Mineral substances dissolved in natural waters, do not alter their color.
3. The various colors of natural waters are due to dissolved organic matter.
4. This organic matter is retained in solution by the aid of alkali, is in mass deep brownish black, in diluted solutions yellowish to brown and belongs to the humic acids.
5. The quantity of the organic matter in solution depends solely on the quantity of the alkali.
6. The less organic matter is dissolved in the water, the less

does its color vary from blue ; with an increase of the organic substance, the color gradually passes into green, yellow and brown, the blue being gradually obscured.

7. Every water meets with a considerable portion of one agent changing the color, namely, humic acid, while the other agent, the alkali, is distributed in very variable degree ; the color of waters poor in free alkali, therefore, approach blue most closely ; an increase of the alkali causes an increase of humic acid, and consequently a change of color into green, yellow and brown.

8. It follows, then, that the nature of the rocks, over which the water flows, furnishes the principal condition for the color of water.

9. Periodical changes of the color of the same water are not caused by a different amount of organic matter, but are dependant on atmospheric conditions, (cloudy sky, &c.)

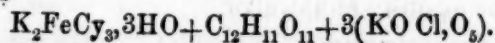
10. As a general rule, waters are the softer the more they approach the brown, and the harder the nearer they come to the blue color. The cause is not the amount of organic matter, but the amount of alkali contained in solution, on the latter of which, however, depends the proportion of the former.— (*Wittst. V. Schr. x. 342-365.*)

#### WHITE GUNPOWDER.

Dr. J. J. Pohl has improved on Augendre's white gunpowder (*Sitzunsb. du Akad. der Wissenschaft zu Wien. Bd. xli. s. 634*). He prescribes the following quantities :

Ferrocyanide of potassium	.	.	28 parts.
Cane sugar	.	.	23 "
Chlorate of potash	.	.	49 "
			100

which give a well-burning powder, and nearly approaches the proportions



The results of the combustion of this mixture he calculates

to be:  $2\text{KCy} + 3\text{KCl} + \text{FeC}_2 + \text{N} + 6\text{CO} + 6\text{CO}_2 + 14\text{HO}$ : or 100 parts by weight of the powder is resolved into

47.44 gaseous bodies.

52.56 solid residue.

---

100.00

The volumes of the gaseous bodies he estimates as follows:

Nitrogen	.	.	.	.	1927.0 C. C.
Carbonic oxide	.	.	.	.	8942.9 "
Carbonic acid	.	.	.	.	8942.9 "
Steam	.	.	.	.	20867.6 "

---

40680.4 C. C.

Compared with ordinary gunpowder, considered as unity, the results are said to be:

	Ordinary powder.	White powder.
Volume of gas set free	1	2.107
Temperature of flame	1	0.641
Residue	1	0.77

It should seem, then, that the new powder has over the old the advantage of greater power, igniting at a lower temperature, and leaving less residue. The author points out several other advantages: the ease with which the white powder is manufactured, there being no necessity for granulating and glazing, and the less danger of accidents. The higher price of the materials he considers is more than compensated for by the smaller quantity required.

A political and literary contemporary who dabbles a little in science, and who describes the above composition as being *equally white and cleanly with common gunpowder*, dismally prophesies innumerable accidents if white powder should ever come into use, in consequence of the explosive nature of chlorate of potash—a danger to which he, with wonderful prescience, says, the author has never alluded. As it happens, Dr. Pohl is at pains to show that fears like those of our contemporary are groundless. Only, he states, the heaviest stroke of iron upon iron is sufficient to produce an explosion, and that it is impossible to ignite the powder by rubbing it between wood and metal, or between stones.—*London Chem. News*, July 6, 1861.

## ON WHITE GUNPOWDER.

By F. HUDSON, Esq.

Having lately prepared different samples of white gunpowder (according to the receipt of Dr. J. J. Pohl, given in the *Chemical News*, July 6) for some military engineering experiments, I have tried the process of separately grinding the materials, viz. chlorate of potash, ferrocyanide of potassium, and cane sugar, and then mixing them; also grinding them together with a little water added, and then dried at a temperature of about 150°. I find that those samples which were prepared moist and then dried are more easily exploded than those prepared by the dry process. In fact, one sample exploded in an open porcelain dish by simple friction with a spatula with which one of my assistants was crushing some of the larger pieces. Through the explosion he was laid up for several weeks and nearly lost his eyesight. No samples prepared dry are as explosive as those prepared moist, the addition of water causing a more perfect mixing of the particles of its chemical constituents than can be effected by the dry grinding process. This accounts for the greater danger attending the use of white gunpowder prepared in the moist way.

A cannon loaded with white gunpowder goes off on the application of a few drops of sulphuric acid (equally as well as with a light applied) to its touch-hole.

This property of the gunpowder may possibly be applied to some advantage in the construction and preparation of bomb shells for long ranges. The shells would not explode (if filled with the white powder and containing a glass vessel with sulphuric acid) until they struck the object. No useless explosion of the shell could take place in the air, as is too often the case with the ordinary fusee shell.

Its expansive or explosive force is also twice that of common gunpowder. In all experiments performed with this white gunpowder, care must be taken not to compress it too violently; otherwise accidents may frequently occur. A blow with a hammer upon stone with some of the powder upon it explodes all samples that I have prepared.—*Chem. News, London, Aug., 1861.*



## LIQUID DIFFUSION APPLIED TO ANALYSIS.

BY THOMAS GRAHAM, Esq., F. R. S., Master of the Mint.

The unequal diffusibility of different substances in water appears to present means of separation not unlike those long derived from unequal volatility. For as regards diffusion, there exists a "volatile" and also a "fixed" class of substances; and these distinctions appear to correspond with differences in molecular constitution of a fundamental nature. Much value is attached to diffusion, as affording the means of bringing out clearly, and subjecting to numerical expression, the distinctive properties of what appear to be two great divisions of chemical substances.

The first, or *diffusive* class of substances, are marked by their tendency to crystallize, either alone or in combination with water.

When in a state of solution they are held by the solvent with a certain force, so as to affect the volatility of water by their presence. The solution is generally free from viscosity, and is always sapid. Their reactions are energetic and quickly affected. This is the class of *crystalloids*.

The other class, of low diffusibility, may be named *colloids*, as they appear to be typified by animal gelatine. They have little, if any, tendency to crystallize, and they affect a vitreous structure. The planes of the crystal, with its hardness and brittleness, are replaced in the colloid by rounded outlines with more or less softness and toughness of texture. Water of crystallization is represented by water of gelatination. Colloids are held in solution by a feeble power, and have little effect on the volatility of the solvent. They are also precipitated from their solution by the addition of crystalloids. The solution of colloids has always a certain degree of viscosity or gumminess, when concentrated. They appear to be insipid or wholly tasteless, unless when they undergo decomposition upon the palate and give rise to sapid crystalloids. Their solid hydrates are gelatinous bodies. They are united to water with a force of low intensity; and such is the character of the combinations in general between a colloid and a crystalloid, even although the latter may be a powerful reagent in its own class, such as

an acid or an alkali. In their chemical reactions, the crystalloidal appears the energetic form, and the colloidal the inert form of matter. The combining equivalent of the colloid appears always to be high, and it has a heavy molecule. Among the colloids rank hydrated silicic acid, and a number of soluble hydrated metallic peroxides, of which little has hitherto been known; also starch, the vegetable gums and dextrin, caramel, tannin, albumen, and vegetable and animal extractive matters. The peculiar structure and chemical indifference of colloids appear to adapt them for the animal organization, of which they become the plastic elements.

Although the two classes are widely separated in their properties, a complete parallelism appears to hold between them. Their existence in nature appears to call for a corresponding division of chemistry into a crystalloid and a colloid department.

Although chemically inert in the ordinary sense, colloids possess a comparative activity of their own, arising out of their physical properties. While the rigidity of the crystalline structure shuts out external impressions, the softness of the gelatinous colloid partakes of fluidity, and enables the colloid to become a medium for liquid diffusion, like water itself. The same penetrability appears to take the form of a capacity for cementation in such colloids as can exist at a high temperature. Hence a wide sensibility on the part of colloids to external agents. Another eminently characteristic quality of colloids, is their mutability. Their existence is a continued metastasis. A colloid may be compared in this respect to water while existing liquid at a temperature below its usual freezing point, or to a supersaturated saline solution. The solution of hydrated silicic acid, for instance, is easily obtained in a state of purity, but cannot be preserved. It may remain fluid for days or weeks in a sealed tube, but is sure to gelatinize at last. Nor does the change of this colloid appear to stop at that point. For the mineral forms of silicic acid deposited from water, such as flint, are found to have passed, during the geological ages of their existence, from the vitreous or colloidal into the crystalline condition (H. Rose). The colloidal is in fact a dynamical state of matter; the crystalloidal being the statical condition. The colloid possesses *ENERGIA*. It may be looked upon as the

probable primary source of the force appearing in the phenomena of vitality, as living matter without form. To the gradual matter also in which colloidal changes take place (for they always demand time as an element), may the chronic nature and periodicity of vital phenomena be ultimately referred.

For the separation of unequally diffusive crystalloids from each other, jar diffusion was had recourse to. The mixed solution was conveyed by means of a pipette to the bottom of a column of water contained in a cylindrical glass jar. A kind of cohobation takes place, a portion of the most diffusing substance rising and separating from the less diffusive substances, more and more completing as it ascends.

The separation of a crystalloid from a colloid is more properly effected by a combination of diffusion with the action of a septum composed of an insoluble colloidal material. Animal membrane will serve for the latter purpose, or a film of gelatinous starch, hydrated gelatin itself, albumen, or animal mucus. But by much the most effective septum used was paper, as it is metamorphosed by sulphuric acid (Gaine). It is now supplied by Messrs. De la Rue, and has become familiar under the name of "vegetable parchment" or "parchment paper." From sheet gutta percha a flat hoop is formed, eight or ten inches in diameter by three inches in depth, and one side is covered by a disc of parchment-paper, so as to form a vessel like a sieve. A mixed solution, which may be supposed to contain sugar and gum, is placed upon the septum to a depth of half an inch, and the instrument then floated upon a considerable volume of water contained in a basin. Three-fourths of the sugar diffuses out in twenty-four hours, and so free from gum as to be scarcely affected by subacetate of lead, and to crystallize on the evaporation of the external water by the heat of a water-bath.

The unequal action of the septum, which causes the separation described, appears to depend on this:—The crystalloid sugar is capable of taking water from the hydrated colloidal septum, and thus obtains a medium for diffusion; but the colloid gum has little or no power to separate the combined water of the same septum, and does not therefore open the door for its escape by diffusion, as the sugar does. This separating action of the colloidal septum is spoken of as *dialysis*.

Dialysis was applied to the preparation of various colloids. The mixed solution obtained by pouring silicate of soda into water acidulated with hydrochloric acid, was placed upon a parchment-paper dialyser and allowed to diffuse into water, the latter being occasionally changed. After the lapse of five days seven-eighths of the original silicic acid was found to remain liquid upon the septum, and to be so free from hydrochloric acid and chloride of sodium as not to give a precipitate with acid nitrate of silver. The true hydrated alumina, and also Mr. Crum's metalumina, were obtained soluble by dialysing solutions of these oxides in the chloride and acetate of the same metal. So also the hydrated peroxide of iron, in addition to the hydrated metaperoxide of iron of M. Péan de Saint Gilles, and the soluble hydrated chromic oxide. The varieties of prussian blue are obtained soluble by dialysing their solution in oxalate of ammonia, the latter salt diffusing away. Stannic and titanic acids appear as insoluble gelatinous hydrates.

A solution of gum-arabic (gummate of lime), dialysed after an addition of hydrochloric acid, gave at once the pure gummic acid of Frémy. Soluble albumen is obtained in a state of purity by dialysing that substance with an addition of acetic acid.

Caramel of sugar, purified by repeated precipitation by alcohol and afterwards by dialysis, contains more carbon than any of the caramellic bodies of Gélis; it forms a tremulous jelly when concentrated, and appears decidedly colloidal. Caramel, like all other colloids, has a soluble and an insoluble modification. The latter has its solubility restored by the action of alkali, followed by that of acetic acid and subsequent dialysis.

Dialysis proves highly useful in separating arsenious acid and metallic poisons from organic fluids. Defibrinated blood, milk, and other organic fluids charged with a few milligrammes of arsenious acid, and placed upon the dialyser, were found to impart the greater proportion of the arsenious acid to the external water in the course of twenty-four hours. The diffusate was so free from organic matter, that the metal could be readily precipitated by sulphuretted hydrogen, and the quantity weighed.

Ice at or near its melting-point appears to be a colloidal substance, and exhibits a resemblance to a firm jelly in elasticity, the tendency to rend, and to redintegrate on contact.



The consideration of the properties of gelatinous colloids appears to show that osmose is principally an affair of the dehydration of the gelatinous septum under influences having a catalytic character, and that the phenomenon is independent of diffusion. The colloidal septum is capable of hydrating itself to a higher degree in contact with pure water than in contact with a saline solution. Colloidal septa, swollen in consequence of contact with dilute acid or alkali, appear to require increased sensibility to osmose, in consequence of their unusually high degree of hydration.—*London Pharm. Journ. August, 1861, from Proceedings of the Royal Society.*

---

#### ON THE COLOR TESTS FOR STRYCHNIA, AND THE DIAGNOSIS OF THE ALKALIES.

*Being the substance of part of the Croonian Lectures for 1861, delivered at the Royal College of Physicians.*

BY WILLIAM A. GUY, M. B., CANTAB.

Fellow of the College, and Professor of Forensic Medicine, King's College, London.

[The following is the conclusion of a series of papers published on this subject in the Pharmaceutical Journal. We have not space for all, and refer those of our readers who desire to examine the whole series, to that work, Vols. 2d and 3d, new series, now in course of publication.—*Ed. Am. Jour. Ph.*]

The last of the four questions proposed for solution in my first communication still remains to be discussed. It relates to the diagnosis of the alkaloids, and was expressed in the following terms: Is it possible by means of the color-tests, or by any simple modification of them, to distinguish the alkaloids from each other?

Before proceeding to examine this question, I must briefly refer to what I have already stated respecting the color-tests. These tests, as commonly understood, are compound tests, consisting first of the reaction of the alkaloid with sulphuric acid, and then of the reaction of the peroxides of lead and manganese, the bichromate of potash, the ferricyanide of potassium, and the permanganate of potash, with the mixture of the alkaloid and sulphuric acid.

The sulphuric acid produces in strychnia no change of color.

Hence the acid itself becomes a test of no mean value. It serves, as I shall point out more particularly presently, to distinguish strychnia from a considerable number of the alkaloids, and also from several substances which give with sulphuric acid alone colored reactions, some of which reactions with the acid alone bear a certain resemblance to those of strychnia with sulphuric acid *plus* the bichromate of potash, ferricyanide of potassium, permanganate of potash, peroxide of lead, or peroxide of manganese. In order to distinguish strychnia from other alkaloids, and from the substances to which I have just referred, it is essential that the sulphuric acid should be first applied to, and well mixed with, the strychnia, and that the absence of color having been noted, the reagents that develop the color should be in their turn applied. In all that I have said on the subject of the color-tests for strychnia, and in what I have yet to say, I assume this mode of procedure to be strictly observed; and I shall continue to speak of these reagents as the color-producing tests.

I have hitherto assumed that the sulphuric acid is applied *cold*; but I shall presently point out that we may greatly add to the value of this constituent portion of the color-tests by first warming and then heating the acid solution. A very slight rise of temperature serves to develop very beautiful and characteristic colors in some of the alkaloids, while it does not change the color of strychnia. A further rise of temperature to the point of causing the mixture to give off vapor, develops color in strychnia also, and deepens or changes the tints already imparted to the alkaloids previously affected by warming the acid mixture.

The color imparted to a solution of strychnia in sulphuric acid by raising it to a temperature at which it gives off vapor is not strongly marked. It is a faint yellow or light greenish-brown, differing somewhat in depth of tint with different specimens of strychnia treated in all respects exactly alike. If the acid solution is allowed to cool, it no longer acts characteristically with the bichromate of potash or the other tests. Their action is wholly destroyed or greatly impaired. Hence, in applying the color-tests for strychnia we must use concentrated pure sulphuric acid, and use it *cold*.

So much for the first part of the color-tests. We add to the

alkaloid under examination sulphuric acid in small quantity—pure, strong and cold; and it undergoes no change of color. The alkaloid, therefore, whatever it may be, belongs to the class of which strychnia is one.

To this cold acid solution of the alkaloid we add a minute fragment of bichromate of potash, ferricyanide of potassium, permanganate of potash, peroxide of lead, or peroxide of manganese. The result is the remarkable development of successive transient, or short-lived, colors already described.

The negative reaction of strong cold sulphuric acid on strychnia, followed by the effect of heat on the acid mixture, and this by the peculiar colors produced by the application of the color-developing substances to the cold acid mixture, constitute a series of phenomena which afford fair promise of proving the means of a successful diagnosis of the alkaloids.

To this work of distinction I now address myself, and in order to prepare the way more completely for the work of tabular analysis towards which the details given in my former communication have been tending, I must again revert to the question whether the action of the color-tests on strychnia is, or is not, characteristic, and therefore diagnostic.

This is a question which must have suggested itself to every chemist engaged in medico-legal inquiries as of the utmost practical importance, and one chemist (Mr. Thomas E. Jenkins) having been employed to investigate a case of suspected poisoning, in which the color-tests gave indications of the presence of strychnia, very properly put the question to the test of experiment by applying to a variety of active principles, including most of the alkaloids, first, colorless concentrated sulphuric acid, and then a fragment of a crystal of bichromate of potash. The experiments, which were carefully performed, and appear to have been strictly comparable one with another, embraced no less than fifty alkaloids and active principles, derived from the animal as well as the vegetable kingdom, and among them uræa and uric acid, and cantharidine. More than half of these substances differed from strychnia in yielding color when treated with sulphuric acid. The smaller half resembled strychnia in this respect. But not one of the whole fifty gave with the bichromate of potash the characteristic colored reactions of strychnia.

nia. Feeling that my time would not be wasted in repeating his experiments, and if possible extending them to substances not included in his list, I possessed myself (partly by the kind assistance of Mr. Morson) of all the alkaloids and similar active principles which could be obtained, and tested them in the same way. To Mr. Jenkins's list, some of which I was not able to procure, I succeeded in adding as many as sixteen new substances. None of these gave the characteristic colored reactions of strychnia, nor any succession of colors any way resembling them, so that I am now in a condition to assert that strychnia stands alone among sixty-six analogous compounds in the reactions which it gives with sulphuric acid followed by the bichromate of potash.

Mr. Jenkins (as will be seen in the table published by him in the *Chemical News* for October 6, 1860,) arranges his reactions in two columns. The first column displays the effect produced by strong sulphuric acid; the second, the changes of color caused by the addition to the acid solution of the bichromate of potash. [See page 527 for the paper of Mr. Jenkins.]

Now this table affords an excellent illustration of the absence of method and logical arrangement. The substances operated on evidently took their places as they chanced to come to hand. Strychnia itself has to be sought out; and substances which give colored reactions with sulphuric acid, find themselves in contact with others that give a negative result.

And yet the table seems to court the attention of lovers of method and logical order. It is almost impossible to keep one's hands off it. At least one would like to place the substances which are not colored by sulphuric acid by themselves, and those that are colored also by themselves. I have undertaken this work of tabulation, and, on inspecting the result, am seized with the same desire to resume the work of arrangement. In both groups there are substances which yield with bichromate of potash the same colors. Why should not these similar reactions be bracketed together? This, accordingly, I have carried into effect, and the result is a splitting up of the fifty substances into several groups of such moderate dimensions, that a man given to tabular analysis can scarcely resist the additional temptation to try whether some modification of the tests them-



selves, or some additional tests, or both together, may not lead to a successful separation and elimination of each and all the substances contained in the table.\* I now proceed to lay before you in a tabular form the results of a very laborious experimental attempt to distinguish some of the principal alkaloids and active principals, whether derived from the vegetable or animal kingdom, from each other.

As the first object which I had in view was to distinguish the poisonous alkaloids and analogous active principles from each other, these substances are of course admitted into the tables; but I have added to these active principles of many of our aperient medicines and common articles of diet; and have excluded only such of those substances as were so strongly characterized by color or odor, as not to be properly grouped with the colorless, or faintly-colored, and inodorous alkaloids and active principles.† The table, divided for convenience into two, consists, as it is, of as many as thirty-five different substances, closely resembling each other in physical properties and chemical composition, and offering collectively a very difficult subject for tabular analysis. The tables, as you have them before you, are the result of a long series of experiments, and were only made to assume their present form after a great many experimental groupings and transpositions.

The first object which I had in view was to find some simple test which would divide the whole body of active principles comprised in the two tables into two principal groups. Concentrated sulphuric acid, as a constituent of the strychnia color-

\* In the lectures given at the College of Physicians, Mr. Jenkins' original table, and the two tabular arrangements alluded to in the text, were sent round. These tables were the more freely used as illustrations of a want of logical arrangement, as the author evidently did not aim at diagnosis, but only at the distinct ascertainment of the peculiar and characteristic reactions of strychnia. The remarks in the text were not, therefore, intended in any respect as a censure of Mr. Jenkins for not adopting an arrangement which, for his purpose, was unnecessary. I may add, that his table comprises several substances which will not be found in the tables I am about to submit. I mean such substances as the kinic and kinovic acids, and such animal products as urea and uric acid.

† To this statement it will be seen that there are one or two exceptions, such as naphthaline, which, though colorless, has the odor of tar.

tests, was obviously well adapted to this purpose. It has the effect of dissolving the alkaloids and active principles *without change of color* in the case of one considerable group (Table I.) and *with change of color* in the case of another considerable group (Table II.) The first group (Table I.) comprises the majority of the active poisonous principles—strychnia, brucia, morphia; atropia, picrotoxia, aconitina; and the animal principle cantharidine. With these and several other alkaloids and active principles, some of which are very harmless ones, concentrated sulphuric acid either produces no change of color, or a faint yellow, straw, or buff tint.\* I speak of *cold concentrated* sulphuric acid, applied as in the preliminary to the color-tests for strychnia.

The next object which I had in view was to subdivide these two large groups (Tables I. and II.) each into two or more smaller groups by some second test, which might also, perchance, produce in some members of the two groups characteristic reactions, so as to eliminate or separate them at once. For this purpose I tried the effect of warming the acid solution of the alkaloids by passing the porcelain slab through the flame of the spirit lamp, so as to raise the temperature of the liquid to a point short of that at which it gives off vapor. This subsidiary test answered its purpose completely; the group of substances in Table II. which had already given colors, more or less characteristic, with the cold acid, underwent further changes of color, more or less peculiar; while the group in Table I., which had undergone no change with the cold acid, became subdivided

\* I ought to state in this place that some of the alkaloids are very sensitive to heat, so that a very slight rise of temperature is followed by a decided development of color. Hence it is possible that experiments made in a cold room in winter may yield results differing somewhat from the same experiments made in a warm room in the height of summer. It must also be borne in mind that sulphuric acid, if not free from nitric acid, may impart to some of the alkaloids a tint of rose, yellow, or buff, sufficiently deep to justify their removal from Table I. to Table II. It may be well, therefore, to state that the experiments on which the tables are founded were made in the winter, in a room with a fire, but in the morning, before the temperature of the room had been raised to a point approaching summer heat; and that the acid employed was free from nitric acid.

into two leading groups, of which one continued without color, and the other underwent changes of color more or less characteristic. In the instance of meconine and of aconitina, the colors developed proved to be peculiar to these substances, so as to lead at once to their elimination from the rest.

By raising still further the temperature of the acid solutions to a point at which vapor was given off, a further separation into distinct groups or classes was found to take place. The six substances which stand first in order in Table I. still remained colorless, while the remainder assumed tints more or less characteristic. Esculine and atropia; picrotoxia, santanine and narcotina; amygdaline and naphthaline, formed themselves into three distinct groups; while strychnia, brucia and morphia gave indications of color less distinct and characteristic.

By this triple test of sulphuric acid, *cold, warmed and heated*, the active principles contained in this division (Table I.) have been either eliminated, or split up into manageable groups, awaiting the application of further tests. It seemed natural to select as the next test in order nitric acid—a known characteristic test of brucia and morphia. By applying this test to the several members of the table in succession, codeia was isolated from the group of six to which it belonged by the distinct yellow color assumed by the acid solution. Emetia was, in like manner, isolated from the other members of the same group of six, by yielding with the acid a yellow-brown color. Atropia, again, was distinguished from esculine by giving a negative result, while esculine assumed a distinct yellow color. In the same way narcotina was detached from its group of three, and naphthaline from its group of two. Again, morphia was distinguished by the rich orange hue given by the acid, together with the red fumes of nitrous acid; and brucia was effectually distinguished from strychnia by the intense red of the former contrasting with the faint tinge of red imparted to ordinary specimens of the latter. For the next eliminating test I have selected sulphuric acid followed by a solution of permanganate of potash, in the proportion of 10 grains of the salt to 3j. of water. The effect of this test on strychnia was to develop its characteristic colors, strongly contrasted with the altogether different colors given with brucia, and still more with the brown

color imparted to morphia, followed by the bleaching of the liquid. This same test divided the somewhat unmanageable group of four at the top of the table (cantharadine and asparagine, and caffeine and cinchonia) into two small groups of two each. In the first two the immediate effect of the permanganate was a red-brown color; in the second, a pink. Picrotoxia and santonine gave the same color (pink) and remained undistinguished. The last and ultimate work of elimination was effected by means of heat applied to the active principle in its solid state. Cantharidine was found to be wholly dissipated by the heat of the spirit lamp, while asparagine gave a bulky carbonaceous deposit. And caffeine was found to present the same difference when compared with cinchonia. Lastly, picrotoxia was found to be distinguished from santonine by the bulky carbonaceous residue with the first, and the scanty deposit of carbon with the second.

Having by this succession of tests obtained a clue to the active principle with which we have been dealing, we should proceed to identify the substance indicated by the table, through its own characteristic tests.

In the second division of the one large table of elimination, or that which comprises active principles colored by contact with cold sulphuric acid, (Table II.,) the same succession of tests is employed. Cold concentrated sulphuric acid at once separates this group of seventeen into eight smaller groups of one, two or six; and the subsequent warming and heating of the colored acid solutions occasions such marked differences of color as to nearly complete the work of elimination. But I have added columns showing the effect of nitric acid, and of the solution of permanganate of potash. The application of heat to the alkaloids themselves did not prove necessary to the work of elimination.

I submit these tables primarily as specimens of *Tables of Elimination*; but also incidentally as tables which may prove serviceable to the Chemist. I am not certain that they constitute the best aid which could be devised to the diagnosis of the alkaloids. I thought that they might, perhaps, admit of being simplified by adding to the three columns headed "sulphuric acid" a fourth, showing the deposit of carbon resulting from the continued application of heat to the acid solution of the al-

kaloid. I tried this reaction in the case of fourteen alkaloids and active principles, comprising all the more active poisons of this class, together with the less important principles, emetia and meconine, and found the alkaloids to differ from each other in the amount of carbonaceous deposit. With strychnia, aconitina and veratria, for instance, the deposit of carbon was less abundant than with brucia, morphia, atropia and the other poisonous alkaloids. But the difference was not such as to justify me in using it as a diagnostic property. So also with the direct application of heat to the alkaloids themselves. Strychnia, morphia, atropia, cantharidine, meconine, picrotoxia and delphinia, after melting, deposited but a scanty carbonaceous ash; while emetia, aconitina and digitaline yielded an abundant ash; and brucia, elaterine, veratria and solanine, yielded an ash intermediate in quantity. This test, again, though fairly applicable to the few cases in Table I., did not seem admissible as a diagnostic on a larger scale. Indeed, the tables, though carefully compiled and based on carefully conducted experiments, are open to the obvious objection that, with different specimens and different quantities of the alkaloids, and with different specimens of sulphuric acid, we may obtain differences of tint, and more or less ready development of color under increase of temperature. The majority of the reactions, however, will, I believe, be found constant for all specimens of fair average purity. One alkaloid, hyoseyamia, which I was not able to procure, is omitted.\*

Of the two tables, Table I. affords the best illustration of a table of elimination. For the sake of brevity, and for other reasons already explained, the figures 1, 2, 3, are added to the words describing the colors developed by the tests. These figures indicate different degrees of intensity. In comparing strychnia with brucia, for instance, the figure (1) attached to the word "yellow" opposite strychnia in the third column means a faint yellow color, less in degree than that indicated by the figure (2) opposite brucia in the same column. So the word "brown" with the annex 3 in the same column opposite escu-

\* In the lectures at the College of Physicians a table was used which showed the colors actually produced by the action of the several reagents on these poisonous alkaloids and active principles.



line and atropia indicates an intense brown color; the words red<sup>3</sup> and orange<sup>3</sup> in the column headed nitric acid indicate intense red and orange respectively.

TABLE I.  
ALKALOIDS, &C., GIVING NO COLOR WITH COLD SULPHURIC ACID.

Alkaloids, &c.	Sulphuric Acid.			Nitric Acid.	Sulphuric Acid, followed by the solution of Permanganate of Potash.	Heat.
	Cold.	Warm.	Hot.			
Cantharadine .....	0	0	0	0	Red brown.....	0
Asparagine.....	0	0	0	0	Red brown.....	Carbon <sup>3</sup>
Caffeine and Theine	0	0	0	0	Pink.....	0
Cinchonia.....	0	0	0	0	Pink.....	Carbon <sup>3</sup>
Codeia .....	0	0	0	Yellow		
Emetia .....	0	0	0	Yellow-brown		
Strychnia.....	0	0	Yellow <sup>1</sup>	Pink <sup>1</sup>	Blue, mulberry, orange	
Brucia .....	0	0	Yellow <sup>2</sup>	Red <sup>3</sup>	Red, brown, orange, yellow	
Morphia.....	0	0	Brown	Orange <sup>3</sup>	Br'n, then bleached	
Esculine .....	0	0	Brown <sup>3</sup>	Yellow		
Atropia.....	0	0	Brown <sup>3</sup>	0		
Meconine.....	0	Blue				
Aconitina.....	0	Brown				
Picrotoxia.....	0	Yellow	Brown	0	Pink.....	Carbon <sup>3</sup>
Santonine.....	0	Yellow	Brown	0	Pink.....	Carbon <sup>1</sup>
Narcotina.....	0	Yellow	Claret	Yellow		
Amygdaline.....	0	Pink	Brown	0		
Naphthaline.....	0	Pink	Brown	Yellow		

TABLE II.  
ALKALOIDS, &C., GIVING COLOR WITH COLD SULPHURIC ACID.

Alkaloids, &c.	Sulphuric Acid.			Nitric Acid.	Sulphuric Acid, followed by the solution of the Permanganate of Potash.
	Cold.	Warm.	Hot.		
Veratria.....	Orange <sup>3</sup>	Scarlet	Claret	0	
Piperine.....	Orange <sup>3</sup>	Red-brown	Green <sup>3</sup>	Orange <sup>3</sup>	
Delphinia.....	Pink <sup>1</sup>	Pink <sup>2</sup>	Brown	0	Yellow <sup>1</sup>
Salicine.....	Pink <sup>1</sup>	Pink <sup>3</sup>	Claret	0	Claret
Digitaline.....	Red-brown <sup>1</sup>	Red-brown <sup>2</sup>	Red-brown <sup>3</sup>	0	Buff
Elatrine.....	Red-brown <sup>1</sup>	Red-brown <sup>2</sup>	Red-brown <sup>3</sup>	0	Pink <sup>3</sup>
Papaverina...	Purple <sup>3</sup>	Purple <sup>2</sup>	Purple <sup>1</sup>	Yellow	Green; slate
Paramorphia.	Purple <sup>1</sup>	Purple <sup>1</sup>	Purple <sup>3</sup>	Yellow	Green; brown
Quinia .....	Yellow	Yellow	Yellow-brown	Yellow	
Aloine .....	Yellow	Yellow <sup>3</sup>	Green	Orange	
Jalapine.....	Yellow	Orange <sup>3</sup>	Red-brown	Yellow	
Narceine.....	Yellow	Red-brown <sup>3</sup>	Red-brown <sup>3</sup>	Green-brown <sup>3</sup>	Buff
Phloritizin .....	Yellow	Red-brown <sup>3</sup>	Red-brown <sup>3</sup>	Red-brown <sup>3</sup>	Pinks
Solania.....	Yellow <sup>3</sup>	Brown <sup>3</sup>	Brown <sup>3</sup>	0	
Cubebine.....	Pink			Yellow	
Quinoidin.....	Brown	Brown	Brown	0	
Sanguinarina	Red-brown	Claret	Claret	Red-brown <sup>2</sup>	

## ON THE DETECTION OF STRYCHNIA AND OTHER VEGETABLE AND ANIMAL PROXIMATE PRINCIPLES.

BY THOMAS E. JENKINS.

The writer having been employed in the month of September, 1855, to investigate chemically, a case of suspected poisoning, a course of analysis was entered into, the result of which indicated the presence of strychnia in the contents of the stomach.

One set of reactions which pointed to this poison, was the coloration produced by oxidizing agents; these re-agents, although said by many chemists to be characteristic tests for strychnia, were not certainly known to be so by me, for the simple reason that I had not tried and seen their effects upon the various organic principles which were accessible to me. To satisfy myself upon this point, the following experiments were made.

It was not deemed necessary to use more than one of the oxidising agents commonly employed for the purpose, because the results produced are substantially the same whether the oxidation be produced by one or the other of them.

The manner of making these experiments was simply to mix on a white porcelain surface about the twentieth of a grain of the organic substance with one or two drops of colorless *concentrated sulphuric acid*, allowing them to remain in contact for a few moments, then testing with a small fragment of a crystal of *bichromate of potassa* drawn through the solution or mixture.

With many of the principles, the sulphuric acid reacted powerfully with the development of beautiful, and, in several instances, intense colors. These I have noticed, as well as those produced by the subsequent action of the bichromate of potassa.

In these experiments I have disregarded all changes except those resulting in the production of colors or their mutations.

In point of time, quantity of substance tested, and mode of operating, the experiments were all as nearly alike as possible.

The proximate principles which I employed were pure and nearly all in crystals.

The changes in color are given in the order in which they occurred.

## 528 DETECTION OF STRYCHNIA AND OTHER PRINCIPLES.

Proximate Principles.	Color produced by Sulphuric Acid.	Color produced by Bichromate of Potassa.
Morphia,		Brown, green.
Narcotia,	Canary yellow,	Brown, dirty green, blue.
Ononine,	Light orange,	Brown, dirty green, blue.
Papaverina,	Purplish red,	Greenish yel. dk. green.
Peucedanine,	Lemon yellow,	Dirty yellow.
Phloridzine,	(evanescent,)	Yellow, green, bluish.
Picrotoxia,	Orange yellow,	Yellow, green.
Rheine,	Intense red,	Muddy, green.
Piperine,	Bromish red,	Dirty, green.
Salicine,	Rose red	Brown, quickly green.
Santonine,		Yellow.
Strychnia,		Blue, purple, red, orange
Theline,		Slight brown yellow.
Theobromine,		Slight brown yellow.
Caffeine,		Light yel. green, brown.
Urea,		Yellow, no change.
Veratria,	Intense brown red,	Brownish yellow, green.
Aconitia,	Brown,	Brownish green, bluish.
Anemonine,		Yellow.
Asarine,	Brownish red,	Brown, dirty green.
Atropia,		Yellow.
Cantharadine,		Yellow.
Codeia,		Green.
Delphinial,		Orange, brown, green?
Columbine,	Brownish yellow,	Brown.
Datura,	Yellow,	Evanescent pink, green.
Digitaline,	Brown,	Yellow, green.
Elaterine,	Brown,	Brownish, yellow.
Emetia,	Brown,	Muddy yellow, green.
Gentianine,	Yellow,	Yellow.
Meconine,	Yellow,	Yellow, green.
Sanguinarina,	Red,	Brown.
Solanine,	Orange,	Yellow, green.
Cinchonia,		Light, green.
Quinia,		Light, green.
Quinidia,		Green.
Bebeerina,	Brown,	Brown, green.
Esculine,		Brown, dark green.
Amygdaline,	Rose red,	Brown, light green, blue
Berberina,	Brownish yellow,	Deep red, brown. [yel.
Brucia,		Bright, brick red, green,
Cetrarine,	Brownish yellow,	Brownish yellow, green.
Cubebine,	Beautiful red,	Yellowish green,
Hamatoxyline,	Orange, dark brown, red,	Dark, brown.
Indigotine,	Dark greenish blue,	Orange.
Kinovic Acid,	Yellow,	Pink, green.
Kinic "		Green.
Gallic "		Green.
Carbazotic "		Brown.
Uric "		Yellowish, green.

<sup>1</sup>The result of one experiment.

Nearly all left a green coloration on the spot after the lapse of twenty-four or forty-eight hours, owing to the reduction of chromic acid to sesquioxide of chrome.

These and other observations I have made in regard to vegetable proximate principles, convince me of their general and powerful deoxidising properties, as well as the establishment of the fact that the "*color test*," or "*oxidising test*," is not only delicate but characteristic, and consequently reliable. In reference to the delicacy of the "*color test*," I found that when one grain of pure strychnine was dissolved in 400,000 drops of distilled water, and one drop of that solution was allowed to evaporate to dryness on a glass plate, not only were the crystals of strychnine revealed by the microscope, but on the addition of a small drop of very white concentrated sulphuric acid, and the subsequent application of the point of a spicula of bichromate of potassa, the characteristic colors were brought out.—*Chemical News, London, Oct. 6, 1860.*

---

#### ON THE SOLIDIFICATION OF CARBONIC ACID.

By MM. A. LOIR and Ch. DRION.

In a paper read before the Academy, June 2, 1860, we stated that atmospheric pressure liquefies carbonic acid when its temperature is reduced to the point at which liquid ammonia evaporates *in vacuo*. By slightly modifying the conditions of the experiment, we have succeeded in solidifying carbonic acid with the aid of an apparatus as simple as those daily employed in chemical laboratories. This hitherto dangerous and costly operation may in future be easily repeated to a chemical class.

If liquid ammonia is introduced into a glass globe, and the interior of this put in communication with a good air-pump, by the intervention of a vessel containing coke impregnated with sulphuric acid, the temperature of the liquid is rapidly reduced from the first strokes of the piston. The liquid begins to solidify towards  $81^{\circ}$ ; it soon becomes a mass, and if the air-pump allows the reducing of the pressure to about a millimetre of mercury, the temperature of the solid ammonia becomes lowered some degrees more and reaches  $89.5^{\circ}$ . This suffices to deter-

mine the liquefaction of carbonic acid under atmospheric pressure. We have, in fact, proved that carbonic gas liquefies by passing a current of the dry carbonic acid gas into a small U shaped tube, immersed in ammonia; but as the temperature obtained is only a few degrees below that of saturation, we get only a small quantity liquefied. If, on the contrary, a slight elevation of pressure is employed, the experiment becomes easy, and yields in a short time notable quantities of solid carbonic acid. The following is the manner of operating: Introduce about 150 cubic centimetres of liquid ammonia into a reversed glass receiver, the sides of which are cemented to a plate with two holes. In the central opening fit a glass tube, closed internally, and reaching the bottom of the receiver, the other opening serving to place the interior of the receiver in communication with the pneumatic machine. Carbonic acid is produced by heating previously-dried bicarbonate of soda in a copper retort, the neck containing fragments of chloride of calcium. One part of this retort communicates by a leaden tube on one hand with the tube which is immersed in liquid ammonia, on the other hand with a small manometer of compressed air. The air being previously expelled from the apparatus, and the temperature of the ammonia lowered to about the point of solidification, the retort is heated, noting meanwhile carefully the pressure. The pressure is thus maintained between three and four atmospheres. Rapidly augmenting transparent crystals soon appear on the sides of the interior tube, so that in about half an hour all that portion of the tube which is plunged in ammonia becomes covered with a thick stratum of crystals (about 25 grammes.) The experiment may then be concluded and the apparatus dismantled.

Solid carbonic acid, obtained under the above-mentioned conditions, appears a colorless mass as transparent as ice. It is easily detached from the sides of the condensing tube by means of a glass rod; it then divides into large cubic crystals, each side about three to four millimetres. Exposed to the air, these crystals slowly return to their gaseous state; they evaporate, leaving no residue. Placed on the hand, they communicate no immediate sensation of heat or cold; they are with difficulty held in the fingers, and with a slight pressure escape as if cov-



ered with an unctuous matter. If one of these crystals is kept between the thumb and forefinger, it soon produces an intolerable burning.

An experiment was performed by placing a certain quantity of solid carbonic acid in a small glass tube communicating with a receiver filled with mercury. After some time the crystals disappeared, leaving no residue, while the receiver was filled with perfectly pure carbonic gas, capable of being completely absorbed by potash. Mixed with ether in a small porcelain crucible, these carbonic acid crystals yield a freezing mixture of a temperature of  $81^{\circ}$ .

As a conclusion to these summary indications, we will add that the liquid ammonia used in our experiments was prepared by M. Bussy's process—that is to say, by acting on ammoniacal gas in a globe surrounded with liquid sulphurous acid, the evaporation of which is expedited by an air-pump. By this method nearly two decilitres of liquid ammonia can be easily obtained in less than two hours.

We determined the temperatures here indicated by means of an alcoholic thermometer, on which we marked two fixed points—that is to say  $0^{\circ}$  at melting ice, and  $40^{\circ}$  at the temperature of melting mercury.—*Lond. Chem. News*, July 13, 1861, from *Comptes Rendus*.

---

#### ON AN IMPROVED METHOD OF PREPARING SODÆ CARBONAS SICCATA.

BY HARRY NAPIER DRAPER, F. C. S. L.

The directions of the three British Pharmacopœias for the preparation of dried carbonate of soda are in almost every respect alike. Crystals of carbonate of soda are exposed to the action of heat until the whole of their water is dispelled. This process has two disadvantages: 1. The carbonate of soda of commerce, which is always used in practice to the exclusion of the pure product of the Pharmacopœias, invariably contains sulphates and chlorides. These, are, of course, found also in the dry salt. 2. The hard cake which results from the desiccation of the crystals is extremely difficult to powder, and never makes a really elegant preparation.

Both these inconveniences may be remedied by the substitution of bicarbonate of soda for the carbonate. When this salt is heated to redness, it, as is well known, loses one of its two equivalents of carbonic acid and all its water, a pure mono-carbonate remaining. Bicarbonate of soda of commerce is nearly always almost pure, never, as far as my experience goes, containing more than slight traces of chlorides and sulphates. When not heated beyond redness, the resulting carbonate is not hard, but, on the contrary, is a loosely cohering perfectly white powder. The slight difference in the cost of carbonate and bicarbonate is of small moment when compared with the saving of time and trouble, and the superiority of the dried carbonate made from the latter salt.—*Lond. Chem. News*, July 13, 1861, from *Dublin Medical Press*.

#### CARBONATE OF POTASH.

The amount of water which carbonate of potash contains has been debated by several chemists. Wackenroder, Phillips, Bérard and Giese, and now Dr. J. J. Pohl (*Sitzungsber d. Akad. der Wissensch. zu Wien.*, bd. xli. s. 630) have severally examined the salt with a view to its determination. The last found in a saturated solution of potash which had been kept in a stoppered bottle for more than a year, some six-sided crystals which, removed into the air, quickly attracted moisture and liquefied. The qualitative analysis of these crystals showed them to be composed of potash, carbonic acid, and water, with mere traces of chlorine and sulphuric acid. When heated to 100° C. they lost 5.180 per cent. of water. Further investigations showed that they contained considerably more water, which could only be expelled by a much higher temperature. The salt dried over sulphuric acid lost, when heated to redness, 15.994 of water, and had the following composition:—

Carbonate of potash . . . . .	83.517
Water . . . . .	15.994
Chlorine, sulphuric acid, and loss . . . . .	0.489

---

100.000

This closely approaches the formula  $2(\text{KO}, \text{CO}_2) \cdot 3\text{H}_2\text{O}$ , which

would give in a hundred parts carbonate of potash 83.676, water 16.324. As, however, the water expelled above  $100^{\circ}$  was only 10.814, the author decides that the salt was  $\text{KO}, \text{CO}_2\text{HO}$  and the excess of water hygroscopic moisture. When exposed to the air this salt quickly attracts 4.5 more water, and then has the formula  $2(\text{KO CO}_2)3\text{HO}$ . By taking up a very small quantity more water the salt liquefies to an oily fluid.—*London Chem. News*, June 22, 1861.

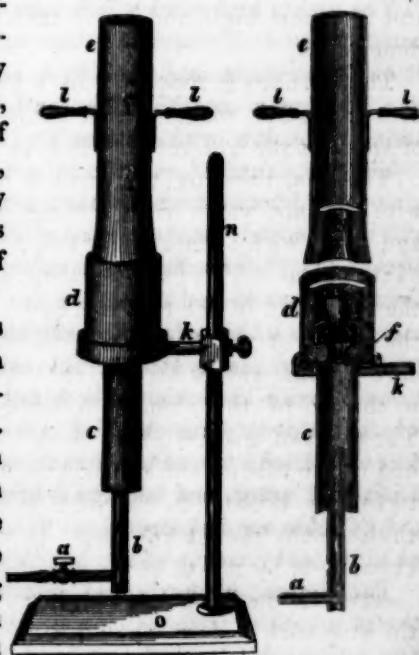
## GRIFFIN'S REVERBERATORY GAS FURNACE,

FOR ANALYTICAL OPERATIONS WITH PLATINUM CRUCIBLES.

This apparatus produces a high temperature without the use of a blowing-machine. It is especially suitable for the decomposition of silicious minerals by fusion with alkaline carbonates in platinum crucibles, being capable of fusing 1000 grains of anhydrous carbonate of soda in ten minutes.

The furnace is represented by the annexed engraving. It consists essentially of a combination of tubes, within which a mixture of coal gas and air is burnt, and in which a small fire-clay or plumbago furnace holds the crucible in the point of greatest heat.

Letter *a* represents a brass tube and stop-cock of  $\frac{1}{4}$  inch bore, for the supply of coal-gas at ordinary pressure. The end of it, fixed within the tube *b*, is pierced with several small holes for the emission of the gas. The brass tube *b* is 9 inches long and 1 inch bore, open at both ends. The iron tube *c* is 8 inches long and  $2\frac{1}{4}$  inches diameter, open at both ends, but



joined at the top to the iron body of the furnace, *d*. This body is 4 inches high and 4 inches in external diameter. The iron tube *e*, made conical at the lower end, is 15 inches long,  $2\frac{1}{4}$  inches wide at the top, and  $3\frac{1}{2}$  inches wide at the bottom. The body of the furnace, *d*, is fitted with a lining of fire-clay or plumbago, the upper part of which is cylindrical, with a bore of  $2\frac{1}{4}$  inches, and the lower part forms a massive diaphragm, with a central opening of  $1\frac{1}{2}$  inches, as shown by *f* in the section. Upon this diaphragm is loosely placed a cast-iron ring with three knife-edges, represented in the section and separately by the figure *h* and *i*, the use of which is to support crucibles. By reversing this ring it can be made to suit crucibles of different sizes. In the lower part of the chimney, *e*, a reverberatory dome of fire-clay or of plumbago is fixed. This serves to deflect the flame downwards upon the top of the crucibles. The space provided in the body of the furnace for the reception of crucibles is  $2\frac{1}{2}$  inches wide and  $2\frac{1}{4}$  inches high, and it will take in a crucible of nearly those dimensions.



The furnace is supported by a flanged iron ring, *k*, attached to a triangular socket, which can be screwed on the  $\frac{3}{8}$  inch rod of an ordinary iron retort stand, as represented by *n*, *o*.

The gas, entering the furnace by the supply-pipe, *a*, mixes with the air, which rises through the lower end of the tube *b*, and burns with a smokeless flame when lighted at the upper end of that tube. This flame is then supplied with additional air by the lower end of the tube *c*, a great draught being produced by the action of the tall and wide chimney, *e*. When the pressure of the gas is strong, the flame reaches from the tube *b* to the top of the chimney *e*, being in that case two feet long. The point of greatest heat is at 8 or 9 inches above the upper end of the tube *b*, and the arrangement of the furnace is such as to fix the crucible in the focus of the heat. The condition of the crucible can at any time be seen on lifting the dome and chimney *e*, by means of the handles *l*, *l*.

The amount of gas supplied to the furnace is regulated by the stop-cock *a*, from which a flexible pipe should lead to a second stop-cock, attached to a fixed gas-pipe. The latter should be opened wider than is necessary to supply the furnace with

gas. The pressure should then be regulated by the stop-cock *a*. This arrangement prevents, to some extent, the blowing down of the flame when the pressure of the gas in the pipe beyond the fixed stop-cock happens to be suddenly lessened.—*London Pharm. Journ. May, 1861.*

---

#### CHEMICAL STONE-WARE MANUFACTURE.

The manufacture of Chemical Stone-ware has latterly assumed so high a degree of importance that we have thought it desirable to bring before our subscribers the following account of the various materials employed, the different processes to which they are subjected, and the numerous uses to which the manufactured articles can be applied. We have, therefore, paid a visit to the potteries of Messrs. J. Cliff and Co., Princes street, Lambeth, and, by the kind courtesy of the firm, have been enabled to trace the various steps of the manufacture, from the reception of the raw material to its conversion into the finished article.

The materials employed are chiefly white clays, obtained from the counties of Devon and Dorset, with a certain amount of kaolin, or China clay, from Cornwall; and for glazing purposes a proportion of Cornish stone, felspar, &c. To the former are added sand, ground flint, and other clays of a more or less infusible character, according to the quality of body required, from Maidstone Wortley, near Leeds, and Newcastle-on-Tyne; and for certain kinds of ware a large proportion of pounded broken earthenware, technically known as rough stuff, or grit, is used.

On referring to the "Mineral Statistics," published by the Geological Museum, we find that the various kinds of pottery and fire clay produced in England alone in the year 1858, amounted to upwards of four hundred thousand tons, and that the estimated value was nearly three hundred thousand pounds. These totals do not include the clays used for the manufacture of bricks and tiles.

The Devonshire clays are purer than those of Dorset, and are used for the manufacture of the smaller wares. Those of Dorset contain a certain admixture of lime and iron, rendering them less pure, and consequently of less value. They are used in



combination with a certain amount of the Devon and Dorset clay for the larger vessels.

The articles intended for the use of chemical manufacturers require great care in making and burning, both as to the proper proportions of the materials employed and their due admixture. These vessels have frequently to resist the action of the strongest acids, and that at a high temperature, consequently it is absolutely necessary that they should admit of a certain amount of expansion and contraction without breaking. This quality is obtained by the mixtures of complex materials, that of each manufacturer varying from the other.

The clays employed at these potteries are sent from the pits in cubical tesses, weighing usually about thirty-five pounds each. After having been well dried these are reduced to powder in a crushing mill. The due admixture requisite to form the articles required is then thrown into a pug mill, which is an upright cylinder, about six feet deep by two in diameter, having a perpendicular shaft running through it. This shaft, which is caused to rotate by steam power, has a number of blades set on it, forming a kind of screw. These arms or blades so work amongst the powdered clays, &c., &c., as to mix them intimately with the water admitted, at the discretion of the workman, into the cylinder through a pipe, and, by their continued action, to force it out of the bottom in a plastic state of such uniform consistency, and so free from bubbles of air, that it is fit for the thrower, who fashions it into the required form on the potter's wheel. This is a kind of lathe, formed of a shaft, having a vertical instead of the usual horizontal position. On the upper extremity of the upright shaft of this lathe is fixed a small circular disk, which revolves with it. On this disk the workman places the lump of prepared clay, and, by pressure with his hands, aided by a few simple tools, fashions this yielding material into any required shape with a truly marvellous degree of dexterity and rapidity. It is with the aid of this simple contrivance that almost all circular articles are made, from penny ink-bottles, which are sold at 2s. 6d. per gross, to the enormous vessels manufactured by Messrs. Cliff, some of which are capable of holding 800 gallons.

The vessels having been made, are placed in the drying-room to

become thoroughly dried ; after which, those termed double-glazed stone-ware, such as spirit cans, druggists' pots, &c., are dipped in liquid glaze, and taken to the kiln to burn. This, as usually constructed, is a large circular room, about ten to fifteen feet in diameter, and fourteen feet high. It is lined with the best Wortley fire-bricks, and has at its sides a number of openings to admit the heat from the fires. It has also apertures in the roof to allow the escape of the waste heat and smoke. The articles to be burnt are placed in the kiln, piled up on one another, as is the case with small goods, or, if large, singly on slabs or quarries. The opening is then built up and carefully cemented over, when the fires are lighted, and are gradually increased until every article in the interior becomes heated to an intense white heat, which process takes, with a fifteen-foot kiln, from forty to fifty hours, consuming ten tons of coal. If the articles are to be salt-glazed, a quantity of very coarse salt is thrown in through the holes left in the roof of the kiln, and into each fire-hole, shortly before the termination of the firing. This is at once converted into vapor by the intense heat, and is decomposed. The soda of the salt unites with the silica of the clay, and forms a fusible glass or glaze upon the surface. So perfect is this glazing, that articles thus protected have been found to resist for twenty years without deterioration the action of the nitrous acid of commerce. After the glazing operation the kiln is carefully stopped, to prevent draughts or cold air, and is then allowed to cool for thirty to forty hours before it is opened and the articles removed.

For other kinds of glazing a different process is employed, the vessels being dipped into a composition of materials that melt during the firing into the kind of glaze required. It may be noticed, that many stone-ware articles are of two colors—as, for example, a brown top with a buff-colored base ; the darker top given by the addition of a proportion of manganese to the glaze.

Messrs. Cliff have introduced several improvements into the process of firing in their patent kiln. For instance, the articles are not exposed to the direct action of the fire, but are enclosed in an inner kiln, the fire playing between the two, and the draught also traversing numerous hollow pipes which are con-

nected with a hollow bottom communicating with the furnace, and support the shelving in the interior ; thus the articles are raised to the required temperature without being exposed to the immediate action of the flames, and are burnt and cooled quicker, and more evenly than by the old process, while at the same time it holds more goods, and has much less gear to remove each charge.

Among the articles manufactured at Messrs. Cliffs' that are more immediately interesting to our subscribers, we may mention the condensing worms, found in all sizes from 18 to 54 inches in height, and from  $\frac{3}{8}$  inch to upwards of three inches bore, stills, taps, bowls, &c., &c., the materials of which these are manufactured varying almost with every variety. The worms are built up by curving the required diameter of pipe to the proper circle sufficient for one coil ; these are, when stiff or "green," built up one over the other to the height required.

In connection with the subject of distillation, we may state that we saw in the process of manufacture a huge condenser, consisting of a series of pipes, each six feet in length by three and a half inches in diameter, to be joined by curved end pieces. Amongst other large sized novel articles we noticed several stone-ware rollers each six feet long, to be used by paper-makers. These had a splendid face, and were most valuable as not being liable to be acted upon by the chlorine used in bleaching the pulp.

So numerous are the chemical wares, such as bottles, receivers, stone jars, percolators, tincture jars, &c., &c., that we can only allude to a few. The adaptation of the spherically ground air-tight stopper to openings of all sizes, even up to eighteen inches or two feet in diameter, renders these wares much more useful to chemists than they would be otherwise, as when used for tincture jars, percolators, and spirit barrels, they possess the advantage of not allowing the loss of any spirit by evaporation, and are easily worked, all the trouble required being that they are kept *clean*.

These spherical stoppers are turned in a lathe, and are fitted to the jars, after being burnt, by grinding with fine emery powder, each jar and lid being afterwards lettered to correspond.

The adaptation of these air-tight lids to stone-ware jars of

all sizes, is of great advantage to the holders of volatile drugs, and those liable to spoil by exposure to the air. It would be impossible to enumerate all the useful implements and appliances that are made of stone-ware, from bottles at less than a farthing each, and cheap infusion pots at 9d. each, to the condensing worm at six guineas, and vessels of enormous bulk at a much greater price.—*Chemist and Druggist*, July 15, 1861.

---

OZONE AS A MEANS OF RESTORING OLD AND FADED  
ENGRAVINGS, &c.

According to v. GORUP-BESANEZ, ozone when properly applied is a most effective and convenient agent for restoring books or prints which have become brown by age, or been soiled or smeared with coloring matter; only a short time being required to render them perfectly white, as if just from the press, and this without injuring in the least the blackness of the printer's ink or the lines of crayon drawings.

As examples of his results the author mentions a book of the sixteenth century upon a page of which several sentences had been painted over, by the monks of that epoch, with a black, shining coloring matter in order to render them illegible, and of which no trace of a line could be detected. After 36 hours treatment with ozone the coloring matter was entirely destroyed, and the most careful scrutiny of the page would have failed to discover that any of the lines had once been painted over. In like manner a wood cut of Durer which had been besmeared with a dark yellow color was completely restored.

Writing ink may be readily discharged by ozone, especially if the paper be subsequently treated with very dilute chlorohydric acid to remove the oxyde of iron.

Printer's ink is not attacked by ozone to any appreciable extent unless the action be long continued. Vegetable coloring matters are completely removed by it, but metallic coloring matters, grease spots and stains produced by fungi cannot thus be destroyed.

As applied in the small way, the method consists in placing a bit of phosphorus about 3 inches in length and  $\frac{1}{4}$  an inch in di-



ameter, the surface of which has been scraped bright, in a wide necked glass carboy, or other large hollow vessel, pouring in as much water, at about  $30^{\circ}$  (C.), as will half cover the phosphorus, closing the vessel with a cork, and allowing the whole to stand until the jar is charged as strongly as possible with ozone, which ordinarily occurs after 12 or 18 hours. Then without removing the phosphorus or water, the paper to be bleached, which has been moistened with water, rolled up, and fastened to a platinum wire in a suitable manner, is hung in the middle of the vessel. The cork is now restored and the apparatus left to itself. The roll of paper is soon surrounded with the fumes arising from the phosphorus, and the stains gradually disappear. The rapidity of the operation of course depends upon the nature of the substance to be discharged—three days having been the longest time required in any of the experiments. Prints which had merely become brown by age and those stained with coffee usually became perfectly white and clean in the course of 48 hours. The action of the ozone, however, must not be continued too long lest some of the finer lines of the engraving should be injured. After all the spots have disappeared, the paper is strongly acid, and if allowed to dry when in this condition would become exceedingly brittle and also dark colored. It is consequently necessary to remove the acid completely. In order to accomplish this the paper is placed in water which is frequently renewed and allowed to lie there until a bit of blue litmus paper pressed against it is no longer reddened. The paper is then passed through water to which a few drops of a solution of soda have been added and is spread upon a glass plate, this is slightly inclined, and a fine stream of water is allowed to flow over the paper during 24 hours. After the paper, on exposure to the air, has become dry enough to remove from the glass without danger of tearing, it is taken off and pressed dry between folds of filter paper.

The author remarks that in case the process were attempted on a larger scale it would probably be well to have glass troughs or boxes blown of the desired form, since it is not easy to prepare suitable vessels by any process of fastening together pieces of glass, the cement being attacked by ozone.



Attempts to apply ozone in restoring oil paintings gave only negative results, the action having been irregular.—*American Journal of Science and Arts*, September, 1861, from *Annalen der Chemie und Pharmacie*.

---

## NON-INFLAMMABLE CLOTHING.

Dr. Odling, of Guy's Hospital, in a letter addressed to a contemporary, on the subject of the recent crinoline accidents, gives the following valuable information on the effects of certain salts upon fabrics:—The various means proposed for rendering textile fabrics non-inflammable were carefully investigated a short time back by two well-known chemists, Messrs. Versmann and Oppenheim. An account of their experiments was read at the Aberdeen meeting of the British Association, in 1859, and was afterwards published in the *Journal of the Society of Arts*, and in a separate form by Trübner and Co., of Paternoster-row. They showed that linen and cotton goods dried after immersion in a solution of one or other of several salts possessing the property of non-inflammability, and that the best results were obtained with a solution of sulphate of ammonia, or of tungstate of soda, neither of which liquids produced any injurious effect upon the tissue or color of the fabric. The tungstate of soda solution was found most applicable to laundry purposes, on account of its not interfering in any way with the process of ironing. Muslins, &c., steeped in a 7 per cent. solution of sulphate of ammonia, or a 20 per cent. solution of tungstate of soda, and then dried, may be held in the flame of a candle or gas lamp without taking fire. That portion of the stuff in contact with the light becomes charred and destroyed, but it does not inflame, and consequently the burning state does not spread to the rest of the material.—*Chemist and Druggist*, London, August, 1861.

---

## ACTION OF SULPHATE OF COPPER WHEN EMPLOYED AS A PRESERVATIVE OF WOOD.

König has investigated the chemical reactions which occur when wood is impregnated with a preservative solution of blue vitriol. He finds as a general rule, that a certain quantity of

basic sulphate of copper remains combined in the pores of the wood in such a manner that it cannot be washed out with water. The copper salt may be seen by its green color in the spaces between the yearly rings in the less compact portions of the wood, that is to say, in those portions which contain the sap. Those varieties of wood which contain the most resin retain the largest amount of the copper salt,—oak, for example, retaining but little of it. The ligneous fibre itself appears to have little or nothing to do with the fixation of the copper salt, and indeed none whatever is retained in chemical combination, so that it cannot be washed out with water, by pure cellulose. When wood from which all resin has been extracted by boiling alcohol, is impregnated with sulphate of copper, it does not become colored like the original resinous wood, and the copper salt contained in it may readily be washed out with water. In like manner, from impregnated resinous wood all the copper salt may be removed, with the resin, by means of alcohol.

The constituents of the blue vitriol are consequently fixed in the wood by means of the resin which this contains.

Further, it is found that the impregnated wood contains less nitrogen than that which is unimpregnated, and that it is even possible to remove all the nitrogenous components of the wood by long continued treatment with the solution of sulphate of copper. The nitrogenous matters being soluble in an excess of this solution, just as the precipitate which forms when aqueous solutions of albumen and sulphate of copper are mixed, is soluble in excess of the latter. Since the nitrogenous matters are well known to be promoters of putrefaction, their removal readily accounts for the increased durability of the impregnated wood.

The author hopes to explain in a similar manner the action of other salts, like chloride of zinc, &c., which are used for preserving timber, and is now engaged in investigating the question.

The utility of blue vitriol as a preservative may also depend in a measure upon the resinous copper salt which is formed, by which the pores of the wood are more or less filled up, and the ligneous fibre covered so that contact with the air is prevented, and the attacks of insects hindered. It is suggested that those cases in which the anticipated benefits have not been realized in practice by impregnating wood with a solution of blue vitriol,

may probably be referred to the use of an insufficient amount of this agent—i. e., where the wood was not immersed in the solution for a sufficient length of time. The action should be one of lixiviation, not merely of absorption.—*Silliman's Journal*, from *Programm der Realschule zu Leipzig*, 1861; *Bættger's polyt. Notizblatt*.

---

#### ON THE ESTIMATION OF COMMERCIAL SALTPETRES,

By M. J. PERSOZ.

The best method for estimating the water is to melt carefully from 50 to 200 grammes of nitre in a platinum capsule, taking care that the temperature is not raised much above the fusing point. Weigh the crucible immediately after cooling. If the saltpetre contains nitrate of lime or magnesia, add about 1 gramme of well-dried neutral chromate of potash, which prevents loss of nitric acid from these nitrates, so easily decomposed by heat.

To estimate insoluble matters, treat the melted mass with water, so as to form a determinate volume of solution N. Filter this carefully; collect, wash, and weigh the insoluble precipitate.

Gay-Lussac's method employed for the estimation of chlorides is to use two standard solutions, one containing 27 grammes and the other 2.7 grammes of pure silver to the litre. Each cubic centimètre of the stronger solution corresponds to 0.01466 grammes of chloride of sodium or 0.01864 grammes of chloride of potassium.

To estimate sulphates, a standard of chloride of barium is used, containing 259.8 grammes of salt, each cubic centimètre representing 0.179 grammes of sulphate of soda, or 0.208 grammes of sulphate of potassa. The operation is conducted in the following manner:—Measure 200 cubic centimètres of the solution N of nitre; after adding a few drops of acid, introduce it into a platinum capsule and boil it freely; then carefully pour

in a slight excess of standard solution. At this point of the process fill a graduated burette with the solution N, and add it, little by little, until the excess of barytic standard solution is exactly precipitated. This last operation is somewhat tedious and difficult, because the solutions do not readily become clear, and it is often necessary to filter small trial quantities. The relation between the total volume of N employed and the volume of barytic standard solution, gives the proportion of sulphate in a given weight of nitre.

Nitric acid is estimated in a very elegant manner, by using dry bichromate of potash, which expels nitric acid from the alkaline nitrates without decomposing the chlorides. The operation is thus conducted:—On a lump of saltpetre, melted and cooled, weighing from 2 to 5 grammes, and placed in a small but sufficiently large platinum crucible, place about twice its weight of previously melted and pulverised bichromate of potash. Weigh, and then carefully heat the whole. At first the reaction is somewhat energetic, and it frequently happens that considerable quantities of the mixture are carried off and are condensed on the inner surface of the cover, which should be shaped like a deep capsule, so that the fusible matter projected against it may fall in the crucible. In proportion as the nitrous vapors diminish, raise the temperature to a dull red heat, taking care to equalise the temperature of the cover by directing a gas jet on it. When the operation is finished, leave the crucible uncovered for a few instants, that the air in it may be renewed; allow it to cool, and weigh it. The loss of the weight indicates the quantity of nitric acid displaced, from which may be calculated the corresponding proportion of nitrate of potash or soda.

If the nitrate analysed contains at the same time potash and soda, an excess will be found by converting the estimated nitric acid into nitrate of potash; and, on the contrary, a deficiency, by converting the acid into nitrate of soda. This excess or deficiency allows of the calculation of the relative proportion of the two alkaline nitrates in the salt analysed.—*Chem. News, London, Aug. 3, 1861. from Ann. du Conservatoire des Arts et Metiers.*

## ADULTERATION OF WAX WITH PARAFFIN.

Ludolt has met with a specimen of wax adulterated with paraffin. He detected the adulteration in the following way, (*Dingler's Polytech. Journal*, Bd. clx. s. 224): He heated a piece of the wax with an excess of fuming sulphuric acid. When the wax melted, a strong action took place, and when the evolution of vapor ceased the heat was continued a little longer, and then the mixture was allowed to cool. After cooling, the paraffin was found as a transparent layer upon the sulphuric acid. So much sulphuric acid must be used, that when the operation is ended the black residue may be fluid, otherwise it is difficult to separate the paraffin. Very small quantities of paraffin, the author says, may be discovered in this way. English sulphuric acid is not convenient for the purpose, as it decomposes the wax but slowly.—*London Chem. News*, Aug. 10, 1861.

## OIL OF CAJEPUT.

Schmidt publishes *Trans. Royal Soc. Edin.*, vol. xxii., p. 360) some researches on cajeput oil. His analysis agrees with that of Blanchet and Sell— $C_{20}H_{16} + 2HO$ —but instead of the name *Dadyle*, given to it by these chemists, Schmidt proposes to call the oil the *Bihydrate of Cajeputene*. It boils at  $175^{\circ} C$ , becomes acid in the air, especially in the presence of alkalies; hydrochloric acid separates a resinous body. When heated to boiling, and some sulphuric acid is added gradually, the oil becomes colored, and between  $170^{\circ}$  and  $175^{\circ}$  a liquid distils having the composition  $C_{20}H_{16} + HO$ , which the author considers the *monohydrate of Cajeputene*. The vapor density of this body is 5.02, and corresponds to 4 volumes, which, as it contains an odd atom of oxygen, is an exceptional case. Repeatedly distilled with anhydrous phosphoric acid, this monohydrate forms a series of hydrocarbons of different degrees of volatility. The first *cajeputene*  $C_{20}H_{16}$  boils between  $160^{\circ}$  and  $165^{\circ}$ , and is a colorless liquid, smelling like the hyacinth; it is insoluble in alcohol, but soluble in ether and oil of turpentine. Its sp. gr. at  $15^{\circ}$  is .850; vapor-density 4.717. Between  $176^{\circ}$  and  $178^{\circ}$



*isocajeputene* passes; like the former it is insoluble in alcohol, but soluble in all proportions in ether and oil of turpentine.

*Paracajeputene* comes over about  $316^{\circ}$ ; it is a viscid fluid of a lemon-yellow color, slightly fluorescent; unlike the two former, it is insoluble in turpentine; in the air it soon changes to a red resin.

Iodine acts on these hydrocarbons when heated, and hydrogen is evolved. Bromine thickens cajeputene and isocajeputene, which are converted into a friable resin by a mixture of sulphuric and nitric acids. Hydrochloric acid colors all three violet, but does not form a definite compound with them. When, however, oil of cajeput is shaken with hydrochloric acid an unstable compound  $C_{20}H_{16} + 2HCl$  is formed, which heated to  $160^{\circ}$  parts with one equivalent of the acid.

*Bichloride of cajeputene* is formed when a current of chlorine is passed through a solution of cajeputene in nitric acid. It is a heavy crystallizable oil with an agreeable smell; it decomposes on distillation, and detonates with nitrate of silver.

The author has also obtained a bromide,  $C_{20}H_{16} + 4Br$ . and a hydriodate,  $C_{20}H_{16} + HI$ .—*London Chem. News*, Aug. 31, 1861.

#### PRODUCTION OF VALUABLE MANURE FROM THE AIR.

By MM. MARGUERITTE and DE SOURDEVAL.

The value of guano and most other concentrated manures consists to a considerable extent of the ammonia which they contain. As three-quarters of the atmospheric air consists of nitrogen, and as hydrogen forms one-ninth of all pure water, if some cheap means could be found for inducing the hydrogen of water to enter into combination with the nitrogen of the air in the form of ammonia, this valuable manure could be produced in unlimited quantities, and the agricultural products of the world enormously increased. The efforts to do this have been, at last, crowned with success, as will be seen by the following abstract of some recent continental researches.

Since the remarkable labors of Messrs. Liebig, Schaltenmann, and Kuhlmann, on the fertilizing action of ammoniacal salts, the production of ammonia at a low price has become a problem

of the highest interest to agriculture. But to arrive at this result it is necessary to obtain the nitrogen elsewhere than in nitrogenous matters; which may, for the most part, be employed directly as manures, and of which the limited quantities and elevated price permits in any event only restricted and costly manufacture.

Atmospheric air is an inexhaustible and gratuitous source of nitrogen. However, this element presents so great an indifference in its chemical reactions, that, notwithstanding the numerous attempts which have been made, chemists have not heretofore succeeded in combining it with hydrogen so as to produce ammonia, artificially. This result, so long desired, has been reserved for MM. Margueritte and De Sourdeval, who have obtained it by employing an agent of which the remarkable properties and neat and precise reactions have permitted them to succeed where all others have failed. This agent is baryta, of which notice has recently been taken on account of the recent applications that M. Kuhlmann has made of it in painting, but of which no person suspected the part that it was to be called to play in the development of the agricultural riches of our country. The manufacture of ammonia is based on a fact entirely new, the cyanuration of barium. It had been believed until the present time that potash and soda alone had the property of determining the formation of cyanogen; that the earthy alkaline bases—baryta, for example, could not, in any case, form cyanides.

Messrs. Margueritte and De Sourdeval have ascertained that this opinion is entirely erroneous, and that baryta, much better than potash or soda, fixes the nitrogen of the air or of animal matters in considerable proportions. It is already understood that, for the preparation of Prussian blue, the cyanide of barium presents great advantages over that of potassium, for the equivalent of baryta costs only about the one-seventh of that of potash. Thus do we find practically and really obtained the result first announced by Desfosses and vainly pursued in France and England, the manufacture of cyanides from the nitrogen of the atmospheric air. This solution, so important, depends on the essential difference which exists between the properties of baryta and those of potash; the first is infusible, fixed, porous, and

becomes deeply cyanuretted without loss; the second is fusible, volatile, and becomes cyanuretted only at the surface, and suffers by volatilization a loss which amounts to 50 per cent. After the cyanide of barium was obtained, the grand problem for Messrs. Margueritte and De Sourdeval to resolve was the transformation of the cyanide into ammonia by means at the same time simple, rapid and inexpensive. The following is the operation:

In an earthen retort is calcined, at an elevated and sustained temperature, a mixture of carbonate of baryta, iron filings in the proportion of about 30 per cent., the refuse of coal tar, and saw-dust. This produces a reduction to the state of anhydrous baryta, of the greater part of the carbonate employed. Afterwards is slowly passed a current of air across the porous mass, the oxygen of which is converted into carbonic oxide by its passage over a column of incandescent charcoal, while its nitrogen, in presence of the charcoal and of the barium, transforms itself into cyanogen and produces considerable quantities of cyanide. In effect, the matter sheltered from the air and cooled, and washed with boiling water, gives with the salts of iron an abundant precipitate of Prussian blue. The mixture thus calcined and cyanuretted is received into a cylinder of either cast or wrought iron, which serves both as an extinguisher and as an apparatus for the transformation of the cyanuret. Through this cylinder, at a temperature less than 300° (Centigrade) is passed a current of steam, which disengages, under the form of ammonia, all the nitrogen contained in the cyanide of barium. It is impossible to foresee all the results of this great discovery. Among other things, it suggests the production of nitric acid from the air by oxidizing ammonia.—*London Chem. News*, No. 46.

---

#### HABITS OF THE CUTTLE FISH.

Those who are familiar with the poulpes and cuttles of our coasts will readily allow that there is something more than usually repulsive in their appearance. Their flabby, corpse-like fleshiness, now lax and soft, now plumping up, their changes of color, the livid hue that comes and goes so strangely, the long

lithe arms with their cold adhesive powers, their uncouth agility, their cunning adroitness and intelligence, and especially the look of their ghastly green eyes, make them decidedly "no canny." It does not need that they should be sufficiently colossal in dimensions to throw their arms over a ship's hull and drag her under water, as Oriental tales pretend, and as old-fashioned naturalists believed, to induce us to give to them a wide berth. It would not be pleasant to be entwined in the embrace of those arms; and we can sympathize with Mr. Beale, who has described his feelings during an encounter which he had with a beastie of this sort, while engaged in searching for shells among the rocks of the Bonin Islands. He was much astonished at seeing at his feet a most extraordinary looking animal, crawling towards the surf, which it had only just left. It was creeping on its eight legs, which, from their soft and flexible nature, bent considerably under the weight of its body, so that it was lifted by the efforts of its tentacula only a small distance from the rocks. It appeared much alarmed at seeing him, and made every effort to escape. Mr. Beale endeavored to stop it by pressing on one of its legs with his foot; but although he used considerable force for that purpose, its strength was so great that it several times liberated its member, in spite of all the efforts he could employ on the wet and slippery rocks. He then laid hold of one of the tentacles with his hand, and held it firmly, so that it appeared as if the limb would be torn asunder by the united efforts of himself and the creature. He then gave it a powerful jerk, wishing to disentangle it from the rocks to which it clung so forcibly by its suckers. This effort it effectually resisted; but, the moment after, the apparently enraged animal lifted its head, with its large projecting eyes, and, loosing its hold of the rocks, suddenly sprang upon Mr. Beale's arm (which he had previously bared to the shoulder for the purpose of thrusting it into holes in the rocks after shells) and clung to it by means of its suckers with great power, endeavoring to get its beak, which could now be seen between the roots of its arms, in a position to bite. A sensation of horror pervaded his whole frame, when he found that this monstrous animal had fixed itself so firmly on his arm. He describes its cold, slimy grasp as extremely sickening; and he loudly called to the



captain, who was similarly engaged at some distance, to come and release him of his disgusting assailant. The captain quickly came, and taking him down to the boat, during which time Mr. Beale was employed in keeping the beak of the Octopus away from his hand, soon released him by destroying his tormentor with the boat-knife, when he disengaged it by portions at a time. This Cephalopod measured across its expanded arms about four feet, while its body was not larger than a man's fist.—*London Pharm. Journ.*, from *Gosse's Romance of Natural History*.

---

ON THE USE OF PHENIC ACID FOR DISINFECTING PURPOSES,  
AND ITS MODE OF ACTION.

By M. J. LEMAIRE.

Since MM. Corne and Demeaux's paper on "Coal-tar" was presented to the Academy, M. Dumas has stated that the disinfecting properties of this body are due to phenic acid. M. Lemaire's experiments prove this opinion correct. He has witnessed the efficacy of phenic acid dissolved or made into emulsion in the preservation of animal matters. Phenic acid made into an emulsion and injected into the bodies of animals will preserve them unaltered in contact with the air; a human adult body can be preserved with less than 50 centimes.

The author has already indicated an important application of phenic acid to the destruction of parasites. An aqueous solution of one per cent. of this acid, and 40 per cent. of acetic acid, removes tinea in 30 or 40 days, and cures itch speedily. Acetic acid is added to the preparation, to enable the medicament to penetrate the epidermis, so as to reach the bulbs of the hair. I am of opinion that the same solution would serve to destroy domestic insects; the powders used for this purpose are effective, but the solution would penetrate better into the crevices of furniture.—*London Chem. News*, Aug. 3, 1861.

---

OBSERVATIONS ON THE ETUA-TREE (KIGLIA AFRICANA.)

The tree called by the Fantees "Etua" is found growing in several districts of the Gold Coast. It attains a height of eighteen feet or more. The fruit, which is, in its transverse



section, of an oblate shape, hangs from the tree by a rounded cord-like stem, sixteen and a half inches long. The length of the fruit is sixteen and a half inches; circumference, in the centre eleven inches, and at the upper and lower ends ten and a half inches; while the diameter is three inches and three-fourths. A tough greenish-brown rind, with dark spots, encloses the pulp, which closely adheres to the cortex. A vertical section shows that the closely-grained nearly dried fleshy fruit is of a reddish-brown color, the seeds being imbedded in a fibrous and tenacious substance. In taste and flavor the fruit is strongly, but not unpleasantly, astringent; the rind less so; but the bark of the tree is strongly astringent; and I feel satisfied that the bark of the Etua-tree will be found a medicine of great value in the treatment of diarrhoea and dysentery. The negroes esteem it as a sovereign cure for dysentery, and have done so for countless ages. On the Gold Coast the fruit is fetish, and is employed by the wily fetish men and women as a charm. When it is so used, the fresh fruit is painted in alternate stripes of red, white and black. The colors are composed of ochre, chalk and charcoal. Thus prepared, the fruit is transfixed to the earth, either in the pathways, house, or about the house of the party who consults the fetish man or woman, as may be directed. Sometimes the fruit is painted entirely black, and then dotted all over with red and white spots, when it is used in a similar manner. The ceremony is an invocation to the fetish to discover the remedy which is suitable to cure the disease of the person seeking advice from the fetish man or woman.—*London Pharm. Journ.*, from *Remarks on the Topography and Diseases of the Gold Coast*. Read before the *Epidemiological Society*, by R. Clarke, Esq., Colonial Surgeon, Gold Coast.

---

#### ON THE MODE OF DISSECTING [OR SKELETONIZING] LEAVES.

Several correspondents having applied to us for information as to the best mode of dissecting leaves, &c., we subjoin the following particulars, which a correspondent has kindly forwarded to us: Steep the leaves, seed-vessels, or other parts of the plant, which are required to be dissected, in rain water;

leave them exposed to its influence until the whole of the soft or pulpy matters are decomposed. The period required for this operation varies much in different leaves, &c., according to their texture; thus, some require but a few weeks, others as many months. When the pulpy parts are completely decomposed, the next operation consists in their removal from the fibro-vascular net-work with which they were originally connected. This requires much care and patience. There are two ways of accomplishing it; one, which consists in carefully exposing them to a stream of fresh water, using at the same time a brush; and the other by simply placing them in fresh water, and removing with care the decomposed portion, in like manner, with a brush. Some difficulty will be found at first in doing this without, at the same time, breaking the fibro-vascular net-work; but a little practice will soon render it easy of accomplishment. The adoption successively of simply fresh water, and a stream of the same, applied by means of a syringe, will be frequently found desirable. The pulpy portions having been removed, and the fibro-vascular net-work obtained, the latter must be then bleached. For this purpose, prepare a weak solution of chloride of lime, by adding about an ounce of a strong solution of that substance to a quart of distilled water; then soak the skeletons in this solution for some hours; generally three or four will suffice, but when they are very thick a longer period will be necessary. After this operation has been performed, wash the skeletons thoroughly in pure water, and, lastly, dry them by freely exposing them to light and air.—*London Pharm. Journ.*

---

#### WORKING IN ALUMINUM.

We extract the following valuable article from the *Ironmonger*. The information is obtained from Messrs. Bell and Brothers, Newcastle-on-Tyne, manufacturers of aluminum.

The peculiar properties of this substance having been so little understood, has hitherto hindered its general employment, but now that it is sold in a pure state at as low a rate as 50s. per pound avoirdupois, it is likely to be much more frequently used.

Aluminum is a metal of fine white color, slightly inclining to blue, especially after being well hammered when cold.

Aluminum, like silver, is susceptible of a very fine "matting," which is not affected by exposure to the air, or by any of the impurities usually present in the atmosphere of towns. To obtain this matting, the aluminum objects (being previously washed in benzole or essence of turpentine) must be plunged into a weak solution of caustic soda, thoroughly well washed, and exposed to the action of strong nitric acid. When the desired matting has been obtained, it must be well washed again, and dried in sawdust.

Aluminum is easily polished or burnished. To do this, it is necessary to use a mixture of equal parts of rum and olive oil, as an intermediate substance between it and the polishing stone or powder used. The polishing stone is steeped in this mixture, and will then burnish aluminum in the same manner as gold and silver is burnished, care being taken not to press too heavily upon the burnishing instrument.

Aluminum can be beaten out, either hot or cold, to the same extent and as perfectly as gold or silver; and it is susceptible of being rolled in much the same way as either of the above metals. Leaves as thin as those used for gilding and silvering can be made of aluminum. Covered ingot moulds of iron answer best for receiving aluminum intended to be used in the rolling mill. Aluminum quickly loses its temper, and therefore requires frequent reheating. The temperature of this reheating is a dull red heat, and when the plates become very thin, this demands the greatest attention.

Aluminum is easily drawn into wire. For this, the ingots are run into an open mould, so as to form a kind of quadrangular shape of a little less than half-an-inch section, which is then beaten upon the edges by the hammer very regularly; the operation of drawing out is then commenced on a horizontal bench, by very gradually reducing the diameter of the metal intended to be drawn into wire, and by frequent reheating, and then the ordinary process of wire-drawing can be proceeded with. When the threads are required extremely fine—as, for example, for the manufacture of lace—the heating becomes a very delicate operation, on account of the fineness of the threads and the fusibility of the metal. The heat of the current of air issuing from

the top of the glass chimney of an Argand lamp will suffice for the heating.

The elasticity of aluminum is very much the same as that of silver, and its tenacity also about the same. The moment after it has been melted, aluminum possesses about the hardness of pure silver; when it is hammered out, it almost resembles that of soft iron; it becomes elastic, acquiring, at the same time, considerable rigidity, and emits the sound of steel when suffered to fall on a hard body.

A property which aluminum manifests in a high degree is that of excessive sonorousness. This property has already rendered it of service in the construction of several musical instruments.

Aluminum is much lighter than ordinary metals. Its density is 2.56, a quarter that of silver, and about a third that of iron. By the action of the hammer, the density of aluminum increases sensibly, so as to become equal to 2.67.

Aluminum melts at a higher temperature than zinc, and a lower one than silver; to melt it, an ordinary earthenware crucible must be employed, without the addition of any sort of flux.

Its low point of fusion, along with its slowness of heating, require that for melting it a less intense fire should be used, but applied for a longer time than in melting silver.

It is easily melted in an open crucible, which facilitates the removal of the dust and other impurities which appear on the surface of the metal; and for the purpose of stirring the entire mass, a clean iron spatula is used.

Aluminum is easily run into metallic moulds; and, still better, for objects of a complicated form, into moulds of dry porous sand, formed so as to allow an easy passage for the air expelled by the metal, which is viscous when melted. It ought to contain a greater number of passage holes, and should be so managed as to run it in one long and perfectly cylindrical git. When heated to a red heat, it ought to be poured out with tolerable rapidity. A small portion of the fused metal should be caused to run into the git itself when full, to compensate for the contraction of the substance of the metal at the moment of solidification.

By following all these precautions, castings of the highest degree of fineness may be obtained; but, at the same time, to suc-



ceed perfectly, an especial acquaintance with the subject is needed.

In the production of work where the use of the lathe becomes necessary, any scratching or tearing of the metal by the tool is avoided by covering the surface to which the tool is applied with a varnish composed of stearic acid and essence of turpentine.

When aluminum is soiled by greasy matters, it can be cleaned by benzole; if it be soiled by dust only, india-rubber, or very weak soap and water may be used.

The pieces of aluminum intended to be soldered must be prepared in the same manner as objects are treated for soldering with tin, viz., by a "tinning;" but it must be remembered that it is indispensable that this tinning must take place with the solder itself. The pieces to be soldered, thus tinned beforehand, are afterwards joined together, and exposed to the flame, either of a gas blowpipe, or any of the ordinary sources of heat used in such cases. In order to unite the solderings, small tools of aluminum are used. These tools are used as little soldering instruments, and they facilitate at the same time the fusion of the solder, and its adhesion to the previously prepared aluminum.

The use of tools of copper or brass used when soldering gold and silver, must be strictly avoided, as they would form colored alloys with the aluminum and the solder. It is of the greatest importance never to use any flux to cause the solder to melt, as all those at present known attack aluminum, and prevent the adhesion of the pieces to be soldered. The use of the little tools of aluminum is an art which the workmen must acquire by practice; in fact, at the moment of fusion the solderings must have the friction applied, as they melt suddenly in a complete manner. In soldering aluminum, it is well to have both hands free, and to use only the foot for the blowing apparatus.

Solders of different compositions and degrees of fusibility have been employed in soldering aluminum. The following are those which have been generally used, ranged according to their order of fusibility:

	I.	II.	III.	IV.	V.
Zinc . . . .	80	85	88	90	94
Copper . . . .	8	6	5	4	2
Aluminum . . .	12	9	7	6	4



No. 4 is the one usually preferred, particularly for soldering smaller objects.

In order to make the solder, the copper is first melted, the necessary aluminum is added, and stirred by means of an iron spatula, unpolished, as it comes from the blacksmith, adding also a little tallow; the zinc is then added, avoiding too much heat, as this last metal is easily oxidized, and is very volatile. —*Chemical News, London, August, 1861.*

---

#### ARSENIOUS ACID IN LARGE DOSES: A SUBSTITUTE FOR QUININE.

By J. TURNER,

Surgeon to H. M. Brigade, Bombay Horse Artillery.

(Communicated to the Royal Medical and Chirurgical Society.)

The author has employed arsenious acid for twenty years in the treatment of intermittent fevers, and on account of the great drain upon the cinchona tree, its failure in India, and his strong opinion as to the equal if not greater value of arsenious acid in the above-named diseases, he now brings the results of his experience before the profession. He considers the fears of an inconvenience or danger arising from the remedy as much exaggerated, and instances the case of a child of nine months, to whom he gave twenty minims of the arsenite of potash\* within ten hours, repeating the dose on the following day, with the only effect of curing an obstinate quotidian intermittent. Mr. Turner's success was so marked, that in 1860 the Director General stated that Mr. Turner should be thanked for "drawing attention to his successful treatment of intermittent fevers by large doses of arsenic, and steps should be taken by circular to urge an extended trial of this remedy, and reports requested." The course usually adopted by the author was to give the arsenite of potash as in the following prescription: Arsenite of potash and compound tincture of cardamoms, of each half a drachm; gum mucilage, three drachms; camphor mixture or water, half an ounce; mix. To be given every second hour four or five times, the last to anticipate the expected paroxysm at least two hours.—*London Pharm. Journ.*

\* Of course *liquor potassæ arsenitis* is intended.—Ed. *Pharm. Journ.*

## NORWEGIAN CASTOR.

At a meeting of the Medical Society of Christiana, M. Ditten, Pharmacien, exhibited two sacs of fresh Castor, each of which weighed 125 grammes. He had bought them of a Norwegian peasant, who had six others in his possession, and who told him that he frequently took *Castors* in the environs of the village in which he lived.

Professor Holst observed on this occasion, that the interior cavity, which had long been considered as the distinctive character of the Siberian Castor, to which Norwegian Castor must be connected, was wanting in the two sacs presented by M. Ditten; but it had been recently shown that the formation of this cavity depended upon the mode in which Castor was dried. The smell and taste peculiar to Siberian Castor alone constitute its certain characteristics. When the Siberian Castor has attained its full development, and when taken in one of the first months of the year, a pair of sacs will weigh 375 grammes. The Castor thrives best in desert and wild countries; the increase of population and the extension given in Norway to agriculture will render the Castor more and more rare in that country.—*London Pharm. Journ.*, from *Archiv fur Pharm. og Technisch. Chem.*, and *Journal de Chimie Médicale*.

## ON THE COMPOSITION AND PROPERTIES OF PERMANGANIC ACID.

By M. H. ASCHOFF.

Mr. Phipson's assertions relative to the non-existence of permanganic acid, already refuted by M. Machuca, are further contradicted by those of M. Aschoff. Having occasion to occupy himself with these inquiries, M. Aschoff has entirely confirmed M. Mitscherlich's long-known views relative to the composition of permanganate of potash. He also proved that violet permanganate becomes changed to green manganate with disengagement of one atom of oxygen, and that the green solution again becomes violet by the action of carbonic acid with a deposit of peroxide of manganese, according to the equation  $3(\text{KO}, \text{MnO}_3) + 2\text{CO} = \text{KO}, \text{Mn}_2\text{O}_7 + \text{MnO}_2 + 2(\text{KO}, \text{CO}_2)$ .

The author afterwards occupied himself with preparing anhydrous permanganic acid. He finds that this preparation can be made without danger, even when operating with 20 grammes of permanganate, by taking care to cool the sulphuric acid (1.845 density) with a refrigerating mixture, and by gradually introducing the permanganate, which must be free from all chloroxygenated combinations.

The dissolved permanganic acid colors the acid dark green, forming at the same time some oily drops, which fall to the bottom of the vessel, and which, after a time, or rather when the mixture is heated, disengage oxygen. Manganate of potash behaves in an analogous way. There is always a deposit of peroxide of manganese, the manganic acid immediately decomposing into peroxide and permanganic acid.

Permanganic acid forms a dark brown-red liquid, fluid at 20°, very unstable, attracting humidity and decomposing with disengagement of oxygen. It gives no trace of vapor in an exhausted receiver, and when heated to above 65° it detonates violently with flame, and is transformed into sesquioxide of manganese. Its composition answers exactly to the formula  $Mn_2O_7$ .

When permanganates or manganates contain chlorides the phenomena are different, and the yellow vapors obtained by M. Dumas are produced by adding sea salt to a mixture of permanganate of potash and sulphuric acid.

M. Aschoff has not succeeded in condensing a sufficient quantity of these vapors for analysis; but he has collected and studied some small drops analogous to anhydrous permanganic acid, which are also isolated in this experiment, and the composition of which answers to the formula of  $Mn_2ClO_6$ . This body may be a new combination or a mixture of anhydrous permanganic acid and a chloroxygenated combination of manganese.—*London Chem. News*, Aug. 24, 1861.

#### THE PRODUCTION OF ALIZARIN FROM NAPHTHALIN.

M. Z. Roussin has communicated to the French Academy a process for the conversion of naphthalin into alizarin. This result, if really practicable, will prove of considerable importance.

Naphthalin is produced in large quantities in the manufacture of gas, and has hitherto been nothing more than a waste product; its conversion, therefore into so valuable an agent as alizarin, will form an important addition to the list of discoveries which have recently added so much to the resources of the dyer.

That some connection exists between the alizarin and the naphthalic series of bodies, has been recognized by chemists, and the probability of the conversion, has we believe, tempted more than one experimenter.

M. Roussin's process consists in making a mixture of binitro-naphthalin and concentrated sulphuric acid in a large porcelain dish heated by a sand bath. As the temperature rises, the binitro-naphthalin dissolves completely in the acid, forming an amber colored solution. When the mixture is at  $200^{\circ}$  Cent. some finely granulated zinc is added. In a few instants an evolution of sulphurous acid takes place, and in half an hour the operation is completed. If a drop or two of the acid liquid be now thrown into cold water, a deep red violet color is developed, owing to the formation of alizarin. It is important in operating upon any large quantity of materials, to add the zinc in small successive portions, and to take care that the temperature of the acid liquid does not exceed the point indicated, as otherwise the reaction becomes excessively violent, and the proportion of alizarin is diminished.

The liquid resulting from the above reaction, is diluted with eight or ten times its volume of water, boiled for a few minutes, and then thrown on a filter. On cooling, the alizarin is deposited in the form of a red jelly, which, when examined under the microscope, is seen to consist of distinct needle-like crystals. The mother liquor has a deep red color, and contains a considerable quantity of alizarin in solution. When diluted with water and properly neutralized, it can be used directly for dyeing purposes. It contains a large amount of sulphate of ammonia in solution.

In this process the zinc may be replaced by tin, iron, sulphur, carbon, and other bodies of a like nature.

We may represent the reaction which takes place by abstracting from the binitro-naphthalin ( $C_{20}H_6(N_2O_8)$ ), two atoms of nitrogen and two of oxygen, when the formula of alizarin ( $C_{20}H_6O_6$ ) is obtained. The  $N_2O_2$  so removed, by taking eight atoms of

the hydrogen resulting from the action of the zinc on the sulphuric acid, becomes two atoms of ammonia ( $NH_4O$ ), which is found as sulphate of ammonia in the mother liquor. Some sulphurous acid is, however, evolved during the experiment.

The author gives the following method for preparing the binitro-naphthalin used in this process. Three to four parts of monohydrated nitric acid (sp. gr. 1.5) are placed under a chimney with a good draught, and one part of naphthalin gradually and cautiously added in small quantities at a time, keeping the liquid constantly stirred. Each addition of the naphthalin causes a noise like the immersion of heated iron into water. On cooling, the liquid sets into a crystalline mass, which is drained, then washed to remove the acid, and dried. It constitutes the binitro-naphthalin almost completely pure.

M. Roussin states that the alizarin obtained by his process possesses all the characteristics and reactions of ordinary madder-alizarin. It is almost insoluble in water, soluble in alcohol and ether. It volatilizes between  $215^{\circ}$  and  $240^{\circ}$  C., yielding a yellow vapor, which deposits red needle-like crystals. It dissolves in alkalies with the characteristic color, and is precipitated by acids. Like madder-alizarin, it furnishes most beautiful lakes, and dyes the same pure tints. The elementary analysis of this artificial alizarin, however, has not yet been made.

The author has also described some other reactions of binitro-naphthalin, by which colored products are obtained. By treating it with a protosalt of tin dissolved in caustic alkali, and heating the mixture in a water-bath, a precipitate is obtained, which when well washed is of a violet blue color, and dissolves in alcohol, furnishing a deep violet solution which dyes perfectly.

A concentrated and boiling solution of cyanide of potassium also acts energetically upon binitro-naphthalin. The liquid becomes reddish brown. When cold, the precipitate is well washed. It dissolves in boiling water and alcohol, yielding a deep blue solution.—*London Pharm. Journ.* July, 1861.



(Continued from page 472.)

Another method, which in many cases is easy of execution, depends on the behaviour of many bodies to alumina. The hydrochloric acid of the fluid is precipitated completely with the solution of sulphate of silver; the fluid, now containing sulphuric acid, is mixed with the hydrate of alumina in a moist condition, and ammonia is added to the solution. If a precipitate results which contains the decomposition product obtained with sugar while the sugar and sulphate of ammonia and a little free ammonia remains dissolved in the fluid, this solution is evaporated, and the residue, when it has acquired a syrupy consistence, is mixed with anhydrous alcohol. The sulphate of ammonia remains undissolved, whilst the sugar is taken up by the alcohol containing a little water, and after evaporation remains behind.

If a volatile decomposition product results by the treatment of the crystals with dilute hydrochloric acid in the heat, this is contained in the receiver which was connected with the flask by means of a refrigeratory apparatus, wherein the boiling with the acidulated water took place. A small portion of the fluid is mixed with carbonate of soda as long as effervescence results with this salt, and is then distilled. If the distillate is pure water, the decomposition product is an acid. On the contrary, if the decomposition product is not an acid, it passes over by distillation, while the hydrochloric acid remains in the residue as common salt. When an acid has been obtained, to obtain it free from hydrochloric acid the distillate is mixed with sulphate of silver as long as chloride of silver is thereby precipitated. The chloride of silver is removed by filtration, and the fluid containing sulphuric acid is distilled, by which the acid distills over with pure water.

When we have determined by the above described examination whether the substance under investigation by the action of hydrochloric acid\* is decomposed or not into sugar and a second product at an elevated temperature, we have still to ascertain *whether by action of an alkali in the heat an analogous decomposition is effected or not*. Many bodies afford, by the treatment with baryta, a carbohydrate, and the same decomposition product which is obtained by treatment with hydrochloric acid. The tannin of galls affords gallic acid as well by the treatment with hydrochloric acid as with baryta water. Others behave in this respect differently. *Esculine* gives, when heated with hydrochloric acid, *esculetine*; on the contrary, by treatment with baryta water, no trace of *esculetine* is obtained. With reference to the carbohydrates, the copulated substances behave likewise similar and dissimilar. The tannin of galls treated with

\* The hydrochloric may in these investigations be replaced by sulphuric acid with but few exceptions; the latter can be more readily removed when the decomposition has been completed. But in general the decomposition proceeds more slowly and less completely, and often not at all, with sulphuric acid than with hydrochloric acid.

hydrochloric acid gives crystallized grape sugar; on the contrary, by treatment with baryta water, a carbohydrate with the decided character of an acid. The thujine from the green parts of *Thuja occidentalis* treated with hydrochloric acid affords a non-crystallizable carbohydrate; on the contrary, by treatment with baryta water, crystallized grape sugar. Independently of this difference, a number of substances still exists which, by treatment with baryta, do not set free a carbohydrate, as is the case by the action of hydrochloric acid, but an acid results which combines with the baryta, while a substance is formed which, by the action of acids, affords sugar and a second decomposition product. Thus populine, by treatment with baryta, gives, besides benzoate of baryta, salicine, and ononine, besides formiate of baryta affords formonetine. Salicine as well as formonetine are copulated sugar compounds.

It will be seen from the examples cited that the behaviour of a substance of that kind to hydrochloric acid renders in no way superfluous the study of its relations to an alkali.

In consequence of the facility with which organic substances oxydize in contact with an alkali in the oxygen of the air, it is necessary to undertake the treatment with baryta in an atmosphere of hydrogen. To accomplish this, an aqueous solution of the substance under examination, as concentrated as possible, is introduced into a flask which is closed with a cork having three perforations. Through one perforation a glass tube passes which is bent at an angle, and serves to connect the flask with a refrigeratory apparatus, and a receiver for the collection of the volatile decomposition products evolved. Through the second perforation, a glass tube bent at a right angle passes almost to the bottom of the flask, through which the hydrogen enters into the flask to drive out the air. The hydrogen is generated from granulated zinc and water by sulphuric acid, and first conducted through a washing bottle containing a solution of bichloride of mercury for the separation of the sulphuretted and arseniuretted hydrogen before it passes into the fluid. Through the third perforation the long beak of a funnel is stuck, which can be rendered air tight by a glass rod ground in above where the beak of the funnel begins. This funnel is filled, when all the air is displaced by hydrogen, with a concentrated hot solution of the hydrate of baryta in water. By raising the glass rod the baryta is allowed to flow into the flask, which is closed before the last drops have run in.\* The baryta water may be thus introduced into the flask without a trace of air coming in contact with the contents of the flask. Often an insoluble compound of baryta with the organic substance results, so that a dense precipitate is formed. In this case the flask, which is heated on a sand-bath, must be frequently shaken, to prevent a deposition of the precipitate. Gener-

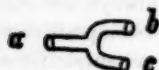
\* When the hydrogen gas is evolved from a flask, the necessary mixture of sulphuric acid and water for the continued development of the gas must be passed in through a funnel constructed in the same manner to prevent the ingress of the air into the bottle.

ally, the decomposition proceeds more rapidly with baryta than with hydrochloric acid. Upon the termination of the decomposition the flask is allowed to cool, in a continuous current of hydrogen. Either a clear solution results, consequently no insoluble baryta compound has been formed, or such is suspended in, or deposited at the bottom of, the fluid. Instead of hydrogen gas, either *carbonic acid gas* is conducted into the flask, or *dilute sulphuric acid* is poured in through the funnel which is capable of being closed. Both operations are intended to convert the excess of baryta into a carbonate or a sulphate. By the sulphuric acid always, and sometimes by the carbonic acid, the baryta compound of the decomposition product formed is decomposed. Whether carbonic acid or sulphuric acid should be used must be ascertained by an experiment which is made with a small portion of the contents of the flask. In this preliminary experiment carbonic acid is employed, and it is observed whether by filtering the fluid in contact with the air it undergoes a change. If no change happens, carbonic acid should be conducted through the fluid in a large quantity. On the contrary, if it changes in the air, the bulk of the fluid must be treated with sulphuric acid. Some substances are oxidized in contact with carbonate of baryta, but others are not. Some compounds which result by treatment of the substances with baryta water are almost quite insoluble in water when an excess of baryta is present, and as this separates by the carbonic acid they dissolve, or from the compounds formed with baryta, compounds poor in baryta are produced which are soluble in water, whilst those rich in baryta are insoluble. In such cases it is more advantageous to add alcohol to the contents of the flask, and to filter the whole. The carbohydrate, or its compound with baryta, is dissolved in the spirituous fluid, and the baryta salt of the second decomposition product remains on the filter. The mass changes on the filter when a readily oxidizable substance is contained in it. The carbohydrate is obtained in the solution, and may be obtained pure by distilling off the spirit and carefully precipitating the baryta by sulphuric acid and then evaporating the fluid free from baryta.

As it is desirable by treatment with baryta to test portions of the material, whether treated with carbonic acid or sulphuric acid, or mixed with alcohol, without bringing the whole mass of the fluid into contact with the air, I will here describe a method by which portions can be used for the preliminary investigation without bringing the entire quantity of the fluid from which these portions are taken into contact with the air. For this purpose, the end of the glass tube is closed through which the hydrogen gas and the aqueous vapor pass out, and the glass rod is loosened by which the funnel serving for the conveyance of the baryta water into the flask is closed. By the pressure which the gas and vapor exercise on the surface of the fluid in the flask, the fluid rises up through the beak of the funnel, and fills the funnel more and more after the glass rod is withdrawn.

When sufficient fluid has been forced in this way into the funnel, this is closed with the glass rod, and the glass tube opened. The portion of the fluid in the funnel required for examination may be removed by means of a pipette.

I must also mention a small arrangement which renders easy the displacement of the hydrogen gas by the carbonic acid gas, without permitting the entrance of air into the apparatus. This arrangement consists of a



spur made of vulcanized caoutchouc. This forked tube at *a* is to be connected with the glass tube, bent at a right angle, which conducts the hydrogen gas into the flask. The forked tube is attached at *b* to the apparatus for evolving hydrogen, and is at *c*, connected with a gasometer containing carbonic acid. While the tube at *b* is closed with a clamp, carbonic acid is allowed to stream out of the gasometer until all the air is driven out of the conducting tube. The carbonic acid passes at *a* freely, as the tube at *b* is closed by a cock. The tube at *c* is now shut with a clamp, and the cock of the gasometer is also closed. Then *a* is attached to the tube in the flask, and *b* with the hydrogen gas apparatus, and the air expelled from the flask by the hydrogen gas. After the baryta has acted sufficiently long, and it is wished to conduct carbonic acid into the flask, the tube is closed at *b*, which in the mean while was open, and the tube is opened at *c*, and carbonic acid allowed to pass in from the gasometer.

When a clear fluid is obtained by the treatment with baryta, it is ascertained whether, by the addition of alcohol, a baryta compound is precipitated, while the carbohydrate remains dissolved in the spirituous fluid. Often in this way a separation can be accomplished.

If a separation is not effected in this way, carbonic acid is conducted into the fluid until all excess of baryta is saturated with carbonic acid. In many cases the baryta compound of the decomposition product is thereby decomposed. The contents of the flask are heated now to the boiling point, while hydrogen gas instead of carbonic acid is passed through the fluid. By boiling, the dissolved bi-carbonate of baryta is converted into the carbonate. The contents of the flask are then filtered. On the filter, carbonate of baryta and a decomposition product remain when the latter is insoluble in water, and was dissolved only as a baryta salt in the water. The carbohydrate is contained in the fluid frequently as a baryta compound (consequently not precipitated from the baryta by carbonic acid), either alone or together with the second decomposition product, which may be dissolved either free from baryta or as a baryta salt. When the substance, as ononine or populine, &c., is decomposed by baryta into a baryta salt and a copulated carbohydrate, a copulated carbohydrate and not a separated carbohydrate is obtained in the filtrate. On this account, we have always to ascertain whether a carbohydrate, or such a copulated compound, is obtained, by the



treatment with baryta in the heat. If, by heating with baryta, instead of a clear solution a solid compound is obtained, which is suspended in the fluid or is deposited therein, it is separated generally, as above described by filtration from the fluid after the addition of alcohol. When the contents of the flask have been treated with an excess of *sulphuric acid* instead of carbonic acid, and then filtered, sulphate of baryta is found on the filter, and sometimes a decomposition product, insoluble in water, mixed with the sulphate of baryta, and in the filtrate a little free sulphuric acid, and either both or one of the decomposition products dissolved therein. By the careful addition of baryta water the sulphuric acid is separated. The fluid freed from sulphuric acid is heated in a distillatory vessel, and the distillate examined for a volatile acid, perchance resulting from the decomposition of the original substance. The residue of the distillation is further examined by mixing a portion thereof with perchloride of tin, sugar of lead, subacetate of lead, and baryta water. It generally happens that one of the decomposition products is thrown down in the form of an insoluble compound by one of these precipitants, while the other decomposition product remains in solution. The excess of tin or lead salt is removed by sulphuretted hydrogen, and the excess of baryta by sulphuric acid. With perchloride of tin, after the removal of the sulphuret of tin and expulsion of the sulphuretted hydrogen, the hydrochloric acid is to be separated by suitable means.

In individual cases, by the application of caustic soda or potash in the place of the hydrate of baryta, perfect solutions are obtained, from which the potash or soda compound of one decomposition product is separated in an insoluble form after the substance under examination has split up. In such cases it is naturally advantageous to employ soda or potash instead of baryta. Generally, the potash or soda compounds separated are insoluble only in potash or soda solutions, but not in pure water. Consequently the washing must be performed with these solutions. The filtered solution is carefully saturated with sulphuric acid, evaporated, and the second decomposition product removed by alcohol from the alkaline sulphates, which are insoluble in that menstruum.

From the results which are obtained by the described investigation it may be determined whether by the treatment with acids or baryta the substance remains unchanged or not, or whether it is split up into two or more products. *But the case is possible that after the treatment with acids or alkalies, no two decomposition products can be discovered, although the original substance no longer exists.* In this case, where only one substance results in the place of another by the action of acids or alkalies, the original substance is converted into a new body, manifestly under the reception of the elements of water, or the expulsion of oxygen and hydrogen in equal equivalents that is under the separation of water. The substance under examination, therefore, does not belong to the class of copulated compounds.



When the methods of examination here described have shown that the separated crystals contain no member of the family of organic bases, and no copulated compound which is decomposable by acids into a carbohydrate and a second decomposition product, or by alkalies, can be broken up into an acid and a copulated carbohydrate, we have to do with an *indifferent vegetable substance*, upon whose nature only an extended investigation can afford a conclusion.

There are substances in the vegetable kingdom which must be reckoned among the *copulated compounds*, but which do not afford a carbohydrate by splitting up by either acids or alkalies, for example, athamantine. But as such bodies break up into two products by the action of acids and alkalies, we are already acquainted with their behaviour and nature by the attempts made to decompose them into a carbohydrate and a second body.

When we are thus far acquainted with the crystals, we proceed to the examination of the *mother liquor* from which they have separated, which must always contain still a little of the substance which has crystallized out, as it is impossible for the separation to be total when it has been accomplished merely by crystallization. But if originally no crystals have separated, the *entire amorphous residue* must be examined which was obtained after the treatment of the watery decoction with sugar of lead and subacetate of lead, and sulphuretted hydrogen, and evaporation.

It has been previously mentioned that we must endeavor to separate this residue, when it has been suitably concentrated and treated with alcohol, into a soluble and an insoluble portion, and also to treat the alcoholic solution with ether, to ascertain whether one or more constituents are thereby precipitated.

By the treatment of the aqueous decoction with animal charcoal it has been ascertained whether bodies are contained therein which are fixed by animal charcoal or not. When such bodies have been detected in the decoction by means of animal charcoal, we must simplify the method of examining the residue in question of the watery decoction which has been precipitated with acetate and subacetate of lead by the application of animal charcoal. If this residue has been treated with alcohol, and thereby a separation has been effected into a part soluble and a part insoluble in alcohol after the evaporation of the alcohol from the part therein insoluble, and the distillation of the alcohol from the part therein soluble, both the resulting residues are separately dissolved in water and treated with animal charcoal. When a precipitate has formed by the addition of ether to the alcoholic solution of a part of the residue, this precipitate, after it has been collected on a filter, as well as the residue of the filtered liquid freed from alcohol and ether, are dissolved in water, and the solutions treated with animal charcoal. The animal charcoal, as before described, is quite exhausted with alcohol to obtain a solution of the body which it has retained, which, after distilling off the alcohol, is examined

for the presence of organic bases and copulated compounds in the same manner as described for the crystals, which sometimes are deposited from the watery decoction after treatment with sugar of lead, subacetate of lead, and sulphuretted hydrogen, and evaporation. As neither all coloring matters nor all bitter principles and organic bases are retained by animal charcoal when their watery solutions are placed in contact with it, a separation of two coloring matters, two bases, or two bitter principles, can often be effected by charcoal, which can only with difficulty be accomplished in other ways.

The further examination for the presence of organic alkaloids, copulated carbohydrates and indifferent organic compounds, is now undertaken in the manner, just now described for the crystals, with those portions which had been absorbed by and were redissolved from charcoal, and with those bodies which remain dissolved in alcoholic ether, and which were precipitated by ether from the alcoholic solution.

In most parts of plants *sugar* is contained which passes into the decoction by boiling with water. It is neither precipitated by sugar of lead nor subacetate of lead, and therefore remains dissolved in the fluid which has been filtered from the precipitate, and freed from lead by sulphuretted hydrogen, and concentrated by evaporation. As this residue always contains acetic acid in rather considerable quantity, derived from the employment of the acetates, the sugar never crystallizes out. At least I have never obtained sugar in this way. By treating this residue with alcohol the sugar dissolves therein, and the acetic acid likewise goes over to the alcohol. On the addition of much ether, the sugar separates from the acetous alcoholic solution as a heavy layer like turpentine at the bottom of the vessel, and adheres to its sides as a gummy covering. With the sugar, under some conditions, other bodies may be precipitated. On that account, the impure sugar is dissolved in alcohol, and mixed with a strong solution of potash. The sugar compound of the potash separates, and most of the other substances remain dissolved in the alcohol containing potash. Whether cane sugar or grape sugar is contained in the watery decoction is not ascertained by this method of proceeding. This may be less easily discovered by the treatment of the watery decoction than by the examination of the spirituous extract of the material under examination. Of this matter we shall speak further on.

It must be observed here, that alcohol will take up almost always the organic bases or their acetates, as well as the copulated carbohydrates, from the residue of the aqueous decoction, left after its treatment with acetate and subacetate of lead and sulphuretted hydrogen. Such bodies are only in exceptional cases found in that portion not dissolved by alcohol; but are frequently precipitated by ether from their alcoholic solution, and are then in most cases intermixed with sugar.

Very frequently a body is contained in the alcoholic extract of the resi-

due in question of the watery decoction which is not precipitated by ether because it is soluble in a mixture of ether and alcohol. Its presence may be easily recognized when the residue which remains after the expulsion of the ether and the alcohol is treated with moderately diluted hydrochloric acid. The fluid becomes turbid when a little of this body is present, and a separation of oily globules on the surface of the acid fluid ensues, and a separation of resinous flocks when it exists in larger quantity, takes place, diffusing a peculiar odor of an ethereal oil. I have met with this substance in plants of the most varied families, so that it may be recognized as one of the most widely-spread constituents of the vegetable kingdom, although it does not exist in all plants. This substance was found by Kavalier in the *Pinus sylvestris*, and analyzed by him, and termed *pinipicrine*. It is a copulated carbohydrate, which is broken up by hydrochloric acid into sugar and an ethereal oil, of which the great part becomes a resin when separated.

As the precipitates which sugar of lead and subacetate of lead produce in the watery decoction of the material under examination are not absolutely insoluble in water, it is intelligible that always after the separation of the lead by sulphuretted hydrogen a fluid is obtained, and by the concentration of the fluid a residue results which contains small quantities of those substances, the bulk of which were precipitated by the salts of lead above named; so that indeed by the addition of a little subacetate of lead always a little precipitate forms in this residue, though not much. When these small quantities of dissolved substances are impeding the separation of other bodies, they must be removed by subacetate of lead, and the lead then separated by sulphuretted hydrogen.

We often find it stated in accounts of analysis that the sugar of the watery decoction, which frequently acts very injuriously in the investigation of the other constituents, must be destroyed by fermentation with the aid of yeast.

But a removal of the sugar in this way can only give occasion too easily to delusions. When no constituents are present which undergo in contact with yeast a splitting up, the constituents still may be decomposed by the yeast and the fermenting sugar. It has been long known that urea, which is not decomposed by yeast, breaks up into carbonic acid and ammonia when it is in a solution of sugar which is set with yeast into fermentation. Other substances also may be decomposed in a similar way when they are contained in a fermenting solution of sugar. On that account this destruction of the sugar by fermentation must only be undertaken as an aid for the isolation of one or more constituents when it has been already discovered that none of the constituents undergo by this method a splitting up or an alteration.

The precipitate which was obtained by sugar of lead in the watery decoction never probably contains an organic base; on the contrary, one or  
(To be continued.)

## Varieties

*Soda*.—This is a most important manufacture. Few changes in the principle of manufacture have taken place during the last ten years, the essential points of the original method of Leblanc (1798) being still adhered to. The extent of the manufacture has largely increased since the year 1851. The value of alkali made annually in England is 2,000,000*l.*; of this half is made in South Lancashire and half in the Newcastle district. The following statistics apply to the South Lancashire alkali trade, per week, in 1861:—Common salt decomposed per week, 2600 tons; sulphuric acid used, 3110 tons; soda ash sold per week, 1800 tons; salt cake sold per week, 180 tons; soda crystals ditto, 170 tons; bicarbonate soda-ditto, 225 tons; and caustic soda ditto, 90 tons. Since 1852 the alkali trade of South Lancashire had more than tripled. The large quantity now produced was manufactured in about twenty-five works, chiefly situated at St. Helen's, Runcorn Gap, Widnes Dock, near Warrington, the neighborhood of Bolton, and Newton Heath. None of the patents for improving the manufacture of alkali had changed the process materially. The improvements of detail since 1851 have been the following:—1. Greater attention to economical working in all the branches. 2. The process of lixiviation of black ash is more completely accomplished than formerly by the arrangement of Mr. Shanks. 3. In some works the black ash is now made by machinery. 4. The soda is now in many alkali works packed in casks by machinery. Since 1851, a new branch of the manufacture has been introduced by the preparation of solid caustic soda, which is largely exported to America and other places. The proposition recently made by Kuhlmann for the employment of the alkali waste as a cement is a very old idea, Mr. Deacon, of Widnes, having used it for making floors for twenty years. In conclusion, the report recognised the important additions to our knowledge of the theory of soda manufacture made by Mr. Gossage. —*London Chem. News*, Sept. 21, 1861.

*New Formulæ for Sinapisms*.—M. Grimault recommends the following formulæ:—Pure Glycerine  $3\frac{1}{2}$  drachms, starch 5 drachms, and volatile oil of mustard 20 drops; and M. Chevallier publishes the following formula for what he terms *Plastic Sinapisms*:—Volatile oil of mustard 20 drops, white pitch 15 drachms. Having melted the pitch, remove it from the fire, stir in the volatile oil, and spread on leather. By the addition of 10 per cent. of resinous oil, the mass can be spread on linen like ordinary adhesive plaster. For use, a piece can be cut off according to the size of the part to which the sinapism is intended to be applied. The effect is very



speedy, and the proportions of the active principle may be varied.—*Journal de Chimie Méd.*, June, p. 357.—*Medical Times and Gazette*.

---

*Chlorate of Potash for Fœtid Breath.*—In the majority of cases, fœtid breath arises from derangement of the stomach; and for such cases, an Italian medical journal recommends the following remedy. Three hours after each meal take a teaspoonful of a solution of 6 grammes of chlorate of potash in 120 grammes of sugared water (about a drachm and a half in four ounces); and at the same time rinse the mouth with the mixture.—*Dublin Medical Press*.

---

*Solubility of Arsenious Acid in Glycerin.*—M. Cap has directed the attention of Pharmaceutists to the solvent power of glycerin for arsenious acid. Equal equivalents of the two substances combine, yielding a viscous oil which solidifies at the freezing point (32° F.), when it presents the appearance of an ordinary fat.—*London Pharm. Journ. and Trans.*, Oct. 1, 1861.

---

*On the Precipitation of Lime from Saccharine Juices by Bone-Black*, by E. F. ANTHON.—The application of bone-black in the refining of sugar, when first introduced, purposed the precipitation of certain organic matter, such as coloring and putrefying substances from their solution, a purpose for which it is eminently fitted. Nor were the expectations of its success disappointed, for up to the present day, animal charcoal remains one of the most important agents in the refining of the various kinds of sugar; though, as regards the end for which it is employed, this is at present a very different one, being not the separation of organic matter, but the precipitation of the lime held in combination by the sugar. More than twenty years ago, I called attention to the fact, that the property of charcoal to precipitate organic matter from its solutions was more or less materially impaired by the presence of alkalies, that for instance a quantity of coal which had absorbed some coloring matter from a slightly acid or a neutral liquid, gave the same up to an alkaline liquid, (after been having previously washed with water). The saccharine solution of lime is necessarily of a strongly alkaline reaction, the more so since its combination with the juice unavoidably causes the presence of other fixed alkalies.

For these reasons it has always appeared to me irrational to attribute to bone-black, besides its well acknowledged decolorizing properties, also that of removing the lime—properties evidently antagonistic, as the purpose to which they are employed is to be attained at one and the same time, and it is quite natural to find either the one or the other end more completely reached at the expense of the other.

The questions which I determined to solve by practical experiment, the results of which follow in a condensed form, are the following:



1. Whether the property of precipitating the lime is due to the pure charcoal, or to its earthy ingredients,—or
2. To atmospheric carbonic acid, as condensed in the pores of the bone-black ;—
3. What quantity of lime may be taken up by the bone-black ;—and
4. What proportion of the lime held in solution is removed from it by varying proportions of bone-black.

The answers to which, so far as proved by my experiments, are as follow :

The earthy ingredients of bone-black contribute in no wise to its property of absorbing lime.

This property, however, is not due to the pure animal coal, but to the condensed carbonic acid, and hence the power of removing the lime is in direct proportion to the amount of carbonic acid absorbed in its pores.

Freshly calcined, this property is but slightly developed, but increases distinctly when the charcoal is exposed to the action of the atmosphere or to carbonic acid, and if to the former under, favorable circumstances, it reaches its maximum in less than ten days.

Not more than three fifths or two-thirds of the lime held in solution can be precipitated by bone-black under the most favorable circumstances. The largest amount of lime absorbed by the charcoal amounted to 4.4 per cent. of its weight which is equal to 3.45 per cent. of condensed carbonic acid.

In connexion with these experiments, Mr. Anthon noticed the formation of formic and hydrocyanic acid in thoroughly purified animal charcoal, which had been kept for four years in a not very tightly closed bottle, as well as the absorption of a large proportion of water, the loss of this charcoal by heating amounting to as much as sixteen per cent.—*American Druggists' Circular and Chemical Gazette, from Dingler's Journal.*

---

*Another new Alkali Metal.*—Whilst investigating the new metal *cæsium*, Bunsen has lately discovered another metal, which seems to resemble potassium as closely as *cæsium* does. It has a very high atomic weight, its hydrate is deliquescent and highly caustic, its carbonate is strongly alkaline, and its nitrate anhydrous like nitrate of potassa, but, unlike that salt its crystalline form is hexagonal. It was obtained from the saline residue from 44,000 kilogrammes of Dürkheim water, and subsequently from *lepidolite*.—*Chemist and Druggist.*

---

*Platinum Coating for Porcelain Crucibles.*—Elsner gives the following (*Elsner's Chem. Tech. Mittheilungen*, 1859-60, s. 124) as a method by which a strong covering of metallic platinum may be given to porcelain vessels. Platinum-black is rubbed up with oil of turpentine, and the mixture is painted over the object to be coated, made red-hot. The vessel coated is then enclosed in a capsule, and well burnt in a furnace, after which it will be found perfectly covered with a strongly fixed covering of metallic platinum.

Platinum black was found to be fusible in the strongest heat of the furnace oven in the Royal Porcelain Manufactory at Berlin.—*Chem. News, London.*

### Abstract of the Minutes of the Philadelphia College of Pharmacy.

At the Semi-Annual Meeting of the College, held 9th mo. 30th, 1861. The President, Charles Ellis, in the Chair.

The Minutes of the Board of Trustees inform of the Election of Augustus Neynaber to resident membership; also, that the degree of Graduate in Pharmacy was conferred upon Theophilis Fischer, after the semi-annual examination in July.

The following Report was read and accepted. On motion, a unanimous vote of thanks was tendered the Committee for their services.

The Committee on the Herbarium respectfully report: That they commenced their labors during the past six months, by completing the arrangement of the herbarium, and adding to it the plants contained in several smaller collections. They have likewise given attention to the mounting of the official plants of the herbarium, but have not been able to finish this work; there are still quite a number of specimens to be mounted. Others mounted last winter might be exchanged for better specimens collected since.

The Committee are gratified to state that they have been materially aided by the botanical works added to the library by the Board of Trustees, viz: Kittel's Flora of Germany, Chapman's Flora of the Southern United States and De Candolle's Prodrômus. The microscope has likewise arrived, and its use has been entirely satisfactory; it is intended to employ it frequently during the coming winter. A few interesting botanical objects have been mounted by us during last summer, and more may be mounted the coming winter. By gradually increasing these objects, as time and opportunity offers, the College may ultimately become possessed of a valuable cabinet, suitable for the microscopic study of botany and of the various specimens of materia medica, together with their adulterations and impurities.

From the 30th of March to the 14th of September we have made 29 botanical excursions, and collected more than 400 different species and varieties of plants, of which about 180 had not been collected during the year 1860, and some of which had not heretofore been in the College herbarium. It affords us pleasure to say that several members of the College, not members of the committee have occasionally supplied us with plants growing at a distance from this city, thus proving an increased interest in botany, and we cannot but wish that others may hereafter show a like regard for the herbarium, which, though embracing a considerable number of species, is yet far from a complete collection of even the plants growing in our own State. Among the contributions we have to notice that from Professor Procter, being a collection of Cuban plants, among which are several official in our own Pharmacopœia, and others employed in their native country for the cure of disease.

We have found spontaneous and fully naturalized in our immediate neighborhood the following plants, which are natives of the Southern States, or of foreign countries, and have, we believe, heretofore, not been

generally noticed in the wild state in our section: *Hesperis matronalis*, Lin., *Hibiscus Syriacus*, Lin., *Philadelphus inodorus*, Lin., *Fedia alitaria*, Vahl., *Helianthus tuberosus*, Lin., *Ligustrum vulgare*, Lin., *Convallaria majalis*, Lin., and *Tradescantia Virginica*, Lin. We have likewise made the attempt of naturalizing several foreign medicinal plants in the woods and meadows near Philadelphia, and may perhaps report on them in a few years. It would be desirable for the committee to have some fresh seeds at their disposal, as we have had applications from other localities for such, and we conceive the naturalization to our soil of useful plants, an undertaking well worthy the efforts and the influence of the College, whose attention deserves likewise to be directed to such of our indigenous plants as manifestly decrease in number. We may instance, *Polygala senega*, Lin., which notoriously becomes scarcer every year, and we believe, is now not to be found in our neighborhood. The eradication of such valuable medicinal plants, is, of course, not countenanced by intelligent pharmacists; it is, perhaps, chiefly to be attributed to collecting the roots at improper seasons, and we have, therefore, a remedy against it, insufficient though it may be, by refusing all roots not gathered in proper time. But while it will be judicious to attempt a propagation, not a culture of this and similar plants, it would probably be advisable to keep an eye on substitutes. In this connection, we would direct attention to the fact that *Saponaria officinalis*, Lin., has been completely naturalized in our soil, and grows very frequently in some places in the vicinity of Philadelphia, so frequent indeed, that here and there it may be regarded as an obnoxious weed. Could not this plant, which contains saponine, a principle analogous to the polygalic acid of *senega*, furnish a partial substitute for the latter?

*Veratrum viride*, Ait., has within a few years past gained considerable reputation for its valuable medicinal properties. The plant is scarce in our neighborhood; indeed we know of but a single place where about a dozen specimens flourish. It would be but half an hour's work to exterminate it there; is it, however, not more consistent to transplant it to other places where it would be likely to increase?

We believe that the attention of the intelligent pharmacist need be but directed to such cases, to instigate him to experiments with the view of increasing the supply of certain plants without resorting to cultivation.

We have had a fair prospect of receiving exchanges from various sections of our country but the political affairs have operated against such an intercourse. Still we are pleased to announce that we have received a small instalment of plants, from Mr. Charles A. Heinitsch, of Lancaster, Pa., with the offer of sending more during the Fall; as yet we have not made any returns for these contributions.

A few weeks ago, we sent collections of plants, all gathered this year, to Dr. A. Flückiger in Bern, Professor G. Theobald, in Chur, and to Professor A. Buchner, in Munich. At the request of Dr. Flückiger, we applied to Professor Jos. Henry, to have them transmitted through the Smithsonian Institution. They have confined their transmissions to books, however, because the addition of specimens of natural history to the invoice, would complicate, very much, the passage of the boxes through the Custom Houses abroad. No other good opportunity offering, we sent these three packages through Messrs. Schafer and Koradi, of this city; but have omitted to enclose any specimens of drugs, &c., promising to Dr. Flückiger, to enclose them next spring, when we should be able to send a more extensive selection from the College Herbarium. It is desirable that the members of the College should contribute some of our American drugs, which the committee have not been able to collect,

and which will benefit the College, by the receipt of European drugs in exchange.

The labors of the provisional committee on the herbarium will cease this evening, the election of a standing committee being now directed by the By-Laws. We beg leave to point out the following work left for the standing committee: Distributing the contributions received during the summer in the herbarium; examining more carefully the doubtful plants; mounting the official plants on boards; and selecting plants for Dr. Flückiger, in Bern, and for Mr. Daniel Hanbury, in London, the latter of whom has kindly offered to procure exchanges for us. With proper and judicious management, the College Herbarium will in a short time become a valuable botanical cabinet, embracing specimens from various parts of the world. We must, therefore, endeavor to obtain soon our North American plants, and to enter into correspondence with Central America, and the West Indies. From the latter islands we are likely to receive some specimens in a short time, partly through the kindness of Mr. E. Durand, who has interested himself in determining the source of bay-rum and is now able to corroborate the inference expressed in a late paper on this subject, that bay-rum is derived from *Myrcia acris*.

All of which is respectfully submitted.

J. M. MAISCH, Chairman.

The following resolution was offered by Edward Parrish, seconded by Dr. R. P. Thomas, and freely discussed by several members. It was unanimously adopted.

*Resolved*, That a Committee of 16 be appointed to obtain specimens of our indigenous materia medica, and of the official preparations made according to the processes of the Pharmacopœia of 1860, as far as these have been decided on, and to send a collection of these on behalf of the College, to the exhibition of the products of all nations to be held in London, in 1862, and that this committee have power to add to their number, and to proceed in the matter as they may find expedient on behalf of the College.

On motion it was directed that the President of the College should be one of the committee, and should appoint his colleagues. The following were then appointed.

Edward Parrish, *Chairman*.

Thomas P. James,

William Procter, Jr.

Fred'k. L. John,

John M. Maisch,

James T. Shinn,

Charles Bullock,

William R. Warner,

Charles Ellis,

Dr. Robert Bridges,

Dr. R. P. Thomas,

Alfred B. Taylor.

Thomas S. Wiegand,

William Evans, Jr.

William C. Bakes,

John E. Carter.

The semi-annual Election for Trustees and Committees was ordered: James T. Shinn and W. J. Jenks, acting as tellers. They reported the following as elected.

Evan T. Ellis,

W. J. Jenks,

A. B. Taylor,

W. Evans, Jr.

Charles Bullock,

W. H. Pile,

J. M. Maisch,

W. C. Bakes.



*Committee on notices of deceased Members.*E. Parrish, *Chairman*,

W. Procter, Jr.

C. Bullock.

*Committee on Herbarium.*J. M. Maisch, *Chairman*

W. R. Warner,

G. J. Scattergood.

Then on motion adjourned.

Edward Parrish, *Secretary*.

---

## Editorial Department.

---

THE GREAT EXHIBITION OF 1862 AT LONDON.—At the last meeting of the Philadelphia College of Pharmacy, Committee was appointed to collect specimens of the materia medica, and to prepare pharmaceutical preparations with the view of making a deposit in the proposed "World's Fair" next year that will illustrate the extent of our medicinal resources, and the quality of the preparations which our pharmacutists have to offer to the physician. The resolution and the list of the Committee to whose attention it was committed, will be found at page 574. Our object in bringing it forward in this place is to call the attention of our pharmaceutical friends at a distance to this work, and invite them to assist incidentally in aiding the Committee in obtaining specimens not easily reached in this locality. The specimens of materia medica intended are strictly those of indigenous growth, including all medicinal plants native to the United States that can be procured, and those naturalized plants that flourish readily here, of importance in medicine, as Belladonna, Hyoscyamus, etc. It is desirable to illustrate roots by specimens of the plants that yield them, or their fruits, or leaves, as the case may be, and thus add to the interest of the collection. It is to be regretted that this idea had not been stated earlier, so that many of the herbaceous plants now out of season, and difficult if not impossible to procure in commerce, might have been included. Should this project be carried out successfully, it will present to the pharmacologists of England an opportunity for studying American drugs never before so thoroughly afforded.

---

THE NEW YORK COLLEGE OF PHARMACY.—For several years past the Trustees of this Institution have committed the tuition of its School of Pharmacy to Dr. Doremus, of the New York Medical College, on chemistry; and Professor Thurber, now of the University of Michigan, on pharmacy and materia medica. These gentlemen having resigned their connection with the school, the Trustees have appointed two pharmacutists to the vacant professorships; viz.: Mr. John M. Maisch, of Philadelphia, well and favorably known by his numerous contributions to the American Journal of Pharmacy, as Professor of Materia Medica and Pharmacy;



whilst the chair of chemistry has been committed to Mr. Ferdinand F. Mayer, of New York. We cannot but congratulate our New York friends upon this new step, by which they have secured the services of two capable and energetic pharmacutists. The untiring assiduity and the ability displayed by Mr. Maisch, in his connection with our College operations, leads us to believe that in his new sphere of action he will prove eminently useful to the cause of pharmaceutical education; and, while regretting his removal from amongst us, we cannot but feel gratified that his sphere of usefulness is enlarged, and that his success in life will be promoted.

---

THE MARYLAND COLLEGE OF PHARMACY.—Since the session of the last winter we were sorry to hear that Dr. Steiner, the Professor of Chemistry in this College, having removed his residence to Frederick City, has resigned his connection with the College. By a circular recently received we are informed that Mr. Alfred M. Mayer has been elected to the vacant chair of chemistry. The lectures will be conducted as heretofore at the College Hall, 47 North Calvert street, Baltimore.

---

THE BRITISH EAST INDIAN EXPERIMENT IN THE CULTURE OF CINCHONA.—Through the last Pharmaceutical Journal, we learn that the plants taken to India by Mr. Markham have all died, owing, it is supposed, to the exposure to severe weather, in being carried across the Andes to the port of embarkation. A new attempt is now being made with plants of the gray and yellow bark, and some seeds. Mr. Markham states in a letter to the *Madras Times*, "that a further supply of plants and seeds is expected from Eucador, and that arrangements have been made with duly qualified agents to continue sending supplies of both as long as they may be necessary." It is also said that attempts will be made to naturalize the plant in the hills of Jamaica and Ceylon. The success of the Dutch in Java, where they already have half a million of plants growing thriftily—chiefly of the *Calisaya* variety—is very encouraging, especially as the percentage of quinia yielded by the Javan plant seems greater than that obtained from the South American bark. Dr. McPherson, in a recent visit to the plantation, was jealously prevented from bringing away a single plant.

---

ON THE DETECTION OF STRYCHNIA AS A POISON, AND THE INFLUENCE OF MORPHIA IN DISGUIISING THE USUAL COLOR-TESTS, by John J. Reese, M. D. of Philadelphia, (from the American Journal of Medical Science.) The reception of the above pamphlet from the author, as we are closing our form, is acknowledged, and we hope in a future number to make an abstract. The author arrives at the conclusion that the presence of morphia in an equal quantity so modifies the action of the color-test of strychnia, as to render it less perfect than has been thought—but that it in nowise interferes with Marshall Hall's frog-test. This is important information, as the cotemporaneous administration of these alkaloids is not unfrequent.

# INDEX

TO VOL. XXXIII. (VOL. IX. THIRD SERIES) OF THE AMERICAN  
JOURNAL OF PHARMACY.

<i>Abernethy, J. M.</i> , on the resinoids .....	299
Abortion in cows occasioned by eating <i>Ustilago madis</i> .....	412
Acclimatation of the ostrich.....	415
Acetate of soda.....	220
Acetic acid by dry distillation of turpentine.....	113
Acetum Ipecacuanhæ.....	139
Acids of Benzoin.....	220, 378
Aconitia and its substitutes .....	100
Aconite liniment.....	103, 104
Aconite plaster.....	104
Act of Pennsylvania regulating the sale of poisons.....	185
Action of reagents on iodide of potassium.....	170
Action on phosphorus by tar vapor... ..	412
Action of sulphate of copper when employed as a preservative of wood.....	541
Adhesive plaster.....	315
<i>Adrian, M.</i> , process for unalterable solutions of perchloride of iron.....	327
Adulteration of carmine.....	17
Adulteration of liquorice.....	315
Adulteration of wax with paraffin.....	545
Adulterations of musk.....	427
<i>Ailanthus glandulosa</i> , analysis of.....	504
<i>Alchin, Alfred</i> , on the preparation of smelling salts.....	351
Alcohol, production of in the United States.....	66
Alcohol—its action and uses.....	432
Alizarin—its artificial production.....	377
Alizarin, from naphthalin, production of.....	558
Alkaloid of coca leaves.....	122
Alkaloid, a new cinchona.....	173
Alkalies, diagnosis of the organic.....	533
Alkali metal, on a new.....	162
Aluminium, working in.....	552
Alumina, hypochlorite of.....	80
Aloes, relative value of Socotrine and Barbadoes aloes.....	137
Alum manufacture in South Lancashire, England.....	483
Amalgam for dentists, malleable.....	128
American Pharmaceutical Association.....	382
Ammonio-citrate of iron.....	267
Ammonio-citrate of iron and quinia.....	268
Amounts of lead contained in some silver coins. ....	325

Anacahuite wood .....	107, 321
Analysis of chalybeate water of Sharon Springs, N. Y. ....	105
Analysis of coca leaves.....	496
Analysis, liquid diffusion applied to .....	517
Anhydrous oxalic acid.....	114
Anilin.....	46, 129
Aniline, properties of.....	246
Ants in Texas, note on.....	221
Antipathy of snakes to garlic and tobacco.....	223
Antimony in arsenious acid.....	407
Aqua St. Johannis .....	116
Aqua lauro-cerasi, uncertain composition of .....	445
Arnica, tinctura .....	11
Apparatus for forming ice artificially.....	50
Applications of glycerin .....	158
Arnica montana.....	450
Arnica hair wash.....	473
Arsenical wall colors and papers.....	314
Arsenic in muriatic acid.....	408
Arsenious acid in large doses as a substitute for quinia. ....	556
Artificial coloring matters, preparation of.....	39, 129, 245
Artificial production of ice.....	501
Artificial preparation of aniline from nitro-benzole.....	131
Artificial production of alizarin.....	377
Aschoff, M. H., on the composition and preparation of permanganic acid.....	557
Asclepias tuberosa, analysis of.....	492
<i>Backhaus, Dr. Reinard</i> , chemical researches on mannite and manna.....	26
<i>Bakes, William C., and E. Parrish</i> , on fashion and fancy in pharmacy.....	1
Balsam of tolu in aqueous mixtures.....	205
Balsam of Peru, use of in Roman Catholic churches.....	262
Barbadoes aloes, value of.....	137
<i>Barnes, J. B.</i> , experiments on spermaceti ointment and olive oil.....	155
<i>Barailler M.</i> , therapeutic properties of essence of valerian.....	239
Bay rum (or bay water,) on the origin of.....	289
<i>Bechamp and St. Pierre, MM.</i> , on the preparation of subnitrate of bismuth..	172
Benzine.....	367
Benzole, preparation of .....	131
Benzole, properties of.....	133
<i>Bernatzik, Prof. W.</i> , on the adulterations of musk.....	427
<i>Berthelot and Buignet</i> , on the maturation of fruits.....	230
Berberina and its salts .....	257
Beta cinchonia.....	417
Bichloride of tin as a solvent .....	214
Bichloride of cajeputin.....	546
Bihydrate of cajeputin.....	545
Biniodide of potassium.....	212
Bitter wine of iron, Physick's.....	18

Bitter wine of iron, Hubbell's.....	19
Bitter yeast.....	216, 316
Black currant, value of the.....	222
Blue milk.....	313
Blistering paper.....	380
<i>Blockey, John S.</i> , on the commercial purification of bitter almond oil.....	435
Blackberry wine.....	473
Blood stains, note on.....	438
<i>Bolley, Prof.</i> , on the discrepancies in the statements of Pelouze and Mohr respecting the solution of gallotannic acid in ether.....	337
Bones for manure, preparation of.....	463
Boettger's method of bleaching sponge.....	224
British Association, Meeting of the, Sept., 1861.....	481
<i>Bullock, Charles.</i> Remarks on the Law of Pennsylvania regulating the sale of poisons, including legal comments on the statute, by a lawyer.....	116
<i>Bunsen and Kirchhoff</i> , on a new alkali metal.....	162
“ “ on a method of analysis by spectrum observations.....	224
<i>Buchner, Prof.</i> , on anacahuite wood.....	321
Breeding of the tape worm.....	224
Butterfly weed.....	492
Cadmium.....	148
Cajeput oil.....	545
Cajeputin.....	545
California yeast.....	192
Camphor, powdered.....	68
Camphor in powder and ointments.....	381
<i>Campbell, Samuel</i> , on wine of citrate.....	109
Cane sugar in its relation to syrups.....	197
Canella alba.....	27
Capture of whales by prussic acid.....	379
Carmine, adulteration of.....	17
<i>Carney, Charles T.</i> , on paraffin as a substitute for wax.....	72
Carrageen.....	74
Carbonte of quinia.....	268
Carbonic acid in the soil.....	464
Carbonic acid, on the solidification of.....	529
Carbonate of soda, method of preparing dried.....	531
Carbonate of potassa.....	532
Cassava, preparation of starch from.....	270
Castor oil, mode of deodorizing.....	339
Castor, Norwegian.....	557
Catalogue of the class of the Philadelphia College of Pharmacy, 1860-61.....	95
Cavendish Society.....	191
Cesium, a new alkali metal.....	228
Cements for mending china.....	350
Chelidonium majus.....	7
Chemical researches on mannite and manna.....	26

Chemical stone-ware manufacture.....	535
Chloride of lithium.....	76
Chloride of lime, spontaneous decomposition of.....	72
Chloride of lime, valuation of.....	348
Chloroformic solution of gutta percha.....	201
Chloroform for masking the taste of substances.....	412
Chloroform on the preparation of.....	421
Chloroform liniment in toothache.....	338
Chlorophylle.....	218
Chrome mines, of Chester County, Pa.....	234
Cinchona trees, cultivation of, in Java.....	47
Cinchona bark of New Granada.....	113
Cinchona barks, on the humoid constituents of.....	171
Cinchona trees, introduction of, into India.....	33
Cimicifuga racemosa.....	391
Citrate of iron and quinia.....	265
Color of water.....	509
Citrate of magnesia.....	409
Clay in foreign paper.....	377
<i>Clothier, William P.</i> , on the bark of <i>Euonymus atropurpureus</i> .....	490
Cleaning of platinum.....	164
Coal tar soap.....	212
Collection of mastic at Chios.....	61
Coloring matter in acetic acid.....	408
- Coca leaves, alkaloid in.....	122
- Coca leaves, chemical constitution of.....	496
- Coccatannic acid.....	126
Coating pills.....	1
Condenser for alcoholic and other liquids.....	15
- Coca or folha sagrada.....	323
Cod liver oil, mode of deodorizing.....	339
Cod liver pills.....	503
Color tests for strychnia.....	533
Colloids.....	529
Commercial purification of oil of bitter almonds.....	435
Commercial iron by hydrogen.....	20
Composition of gutta percha.....	407
Constitution of digitalin.....	69
Conium seeds, production of, in the United States.....	136
Convallaria in ecchymosis.....	336
Conversion of monohydrated into common phosphoric acid.....	385
Conversion of theobromin into caffein.....	406
Constitution of scammony resin.....	430
<i>Cooke, W. C.</i> , on kekui or kekune oil.....	62
Corydalia.....	112
Copper in snuff.....	215
<i>Cook, Josias</i> , on the preparation of starch from cassava.....	270
Cork trade of Bordeaux.....	504



Corn plaster.....	408
Composition and properties of permanganic acid.....	557
Cortex winterianus.....	27
Crayons or drawing chalks.....	473
Creasotum chloroformatum.....	116
<i>Cressler, C. H.</i> , on the ergot of Indian corn.....	306
<i>Crookes, William</i> , on a supposed new element of the sulphur group.....	363
Crystalloids.....	529
Crystallized compounds of aluminium with the metals.....	220
Cultivation of cinchona trees in Java.....	47
Cuttlefish, habits of the.....	548
<i>Cedrela ferbrifuga</i> , on the bark of.....	505
Dahlke's filter for chemical liquids.....	229
Dalleoquine or quinine green.....	407
Daphnin.....	325
<i>Davis, George H.</i> , on <i>cimicifuga racemosa</i> .....	391
<i>De Vry, Dr.</i> , on the culture of cinchona in India.....	47
<i>De Luca, M. L.</i> , on the preparation and preservation of hydrogen reduced iron.....	152
Detection of nitric acid.....	111
Detection of phosphorus in cases of poisoning.....	126
Detection of tartar in vinegar.....	148
Detection of castor oil in volatile oils.....	223
Detection of phosphorus.....	316
Detection of strychnia and other principles.....	527
<i>Denville and Debray, MM.</i> , on the manufacture of oxygen.....	145
Density of ice.....	379
Diffusion applied to analysis, liquid.....	513
Diffusion of germs.....	341
Dispensing.....	3
Distillation of coal tar.....	42
Digitalin, constitution of.....	69
Distilled water of copaiba.....	413
Diagnosis of the organic alkalies.....	517
Deoxidation of protosalts of iron.....	217
Double salt of carbonate of lime and chloride of calcium.....	407
Drug examiners and the new administration.....	186
Drug examiners.....	287
<i>Draper, Harry N., F. C. S. L.</i> , on the uncertainty of composition of aqua lauro-cerasi.....	445
“ “ on an improved method of preparing sodæ carbonas sic- cata.....	531
<i>Dussart, M. L.</i> , on the solution of tartar in vinegar.....	148
Dr. Torrey's herbarium.....	223
<i>Duncan, Jr. A.</i> , effect of oxalate of ammonia on the precipitation of Prussian blue.....	363

Editorial department.....	89, 185, 287, 382, 476, 575
<i>Eliot &amp; Storer</i> . On the amounts of lead in some silver coins.....	335
Elixir of valerianate of ammonia.....	345
Emplastrum plumbi.....	317
Emery.....	112
Empyreumatic grain oil.....	110
<i>Enos, Trovillo H. K.</i> , on elixir of valerianate of ammonia.....	345
Estimation of silver in the metallic state.....	110
Estimation of nitric acid.....	112
Estimation of morphia.....	219
Estimation of free carbonic acid in water.....	406
Estimation of commercial saltpetres.....	543
Essence of valerian, therapeutical properties of.....	239
Ergot of Indian corn.....	306
Eupion naphtha.....	367
Extraction of aniline from coal tar.....	129
Extract of cannabis indica in pharmaceutical preparations.....	203
Examination of extracts for alkaloids.....	216
Examination of shellac.....	313
Extract and fluid extract of cimicifuga.....	343
Extractum anthemidis fluidum.....	389
Examination of cochineal.....	410
Extracts from different parts of plants, relation of.....	414
Etua tree of the gold coast.....	550
<i>Euonymus atropurpureus</i> , bark of.....	490
<i>Flückiger Dr. F. A.</i> , on the bark cedrela febrifuga.....	505
Fancy and fashion in pharmacy.....	1
Fat in urine.....	112
Ferments, on the origin of.....	165
Fermentation of sugar of milk.....	408
Ferrated tincture of bark.....	193
Ferrated tincture of cinchona.....	304
Ferridcyanide of potassium.....	217
<i>Fergus, Dr.</i> , on a new salt of iron and quinia.....	238
Ferri carbonas effervescens.....	474
<i>Fish, Henry F.</i> , on powdered camphor as a pharmaceutical preparation.....	68
“ “ on the production of conium seeds in the United States.....	136
Filter for chemical liquids.....	229
Filter, Prof. Malapert's.....	32
Fluid extract of cimicifuga.....	343
Fluid extract of vanilla.....	383
Fluorine in the ashes of lycopodium complanatum.....	406
Fleming's tincture of aconite.....	104
Ferri protochloridum.....	110
Formule of the opium alkaloids.....	24
French opium.....	457

Garancin, manufacture of.....	484
Gas furnace, Griffin's reverberatory.....	533
Giles, Richard W., on the relative values of Socotrine and Barbadoes aloes.....	137
Githens, William H. H., on several extemporaneous pharmaceutical preparations.....	203
Gleanings from the French Journals.....	212, 411
Gleanings from the German Journals.....	110, 215, 312, 402
Gleanings—foreign and domestic.....	221, 405
Glycerin pomade of iodide of potassium.....	236
Glonoin or nitro-glycerin.....	313
Glycerole of chlorate of potassa.....	320
Glycerole of oil of mustard.....	320
Glycerine in incipient dysentery.....	116
Gore, George, Esq., on the preparation of liquid carbonic acid.....	328
Gorup Besanez, Von, on ozone as a means of restoring old and faded engravings.....	539
Graduating class of 1861.....	282
Greek tobacco.....	313
Græger, R., on the value of different kinds of soap.....	354
Green dye from rhamnus catharticus.....	378
Graham, Thomas, Esq., F. R. S., liquid diffusion applied to analysis.....	513
Griffin's reverberatory gas furnace.....	533
Guaiacum resin in aqueous mixtures.....	204
Gutta percha, chloroformic solution of.....	201
Gun cotton.....	222, 312
Gun cotton for collodion.....	316
Grey, William, A., M. B., on the color-tests for strychnia and the diagnosis of the alkalies.....	317
Guibourt, M., on blood stains.....	438
Habits of the cuttle-fish.....	548
Hanbury, Daniel, note on the use of balsam of Peru in the Roman Catholic Church.....	262
Heintzelman, Joseph A., on syrup of assafœtida.....	211
“ “ on extract, fluid extract and syrup of chamomile.....	389
Himalaya musk deer, its haunts, and the method of taking the musk.....	259
Hodgson, Jr., William, on chloroformic solution of gutta serena.....	201
Hudson, F., on white gunpowder.....	510
Hollandt, D. H., on the bark of <i>Millingtonia hortensis</i> .....	507
Hemlock seed among aniseed.....	408
Henry, L., on berberina and its salts.....	257
Herzog, Dr. C., on the detection of phosphorus in cases of poisoning.....	126
Helleborus, on some species of.....	426
Heydenreich, Emilie, on phosphate of sesquioxide of iron.....	294
Hesse, O., on the humoid constituents of the cinchona barks.....	171
Hydrogen reduced iron.....	152
Hoffman, Dr., on the spontaneous decomposition of chloride of lime.....	72
Hops and lupulin.....	77

Humoid constituents of cinchona bark.....	171
Hypochlorite of alumina.....	80
Hydrocyanic acid from <i>Prunus padus</i> .....	217
Hydriodate of ammonia.....	346
Hydrargyro-iodide of arsenic.....	411
Importation of mineral waters.....	97
Improved method of preparing dried carbonate of soda.....	531
Influence of cyanogen on iodoform.....	219
Inflammability of the flowers of <i>Dictamnus albus</i> .....	222
Indian corn, paper from leaves of the.....	
Indian corn, on the ergot of.....	306
Influence of the color of glass bottles on their contents.....	
Inosite.....	402
Introduction of cinchona trees into India.....	33
Infamous quackery.....	191
Insects in grain.....	473
Iodide of potassium, pomade of.....	236
Iron by hydrogen, on commercial.....	20
Iron and quinine, a new salt of.....	238
Isocajeputin.....	546
Jellies.....	4
<i>Jeannel, M.</i> , on the mode of disinfecting and perfuming cod liver and castor oils.....	339
<i>Jenkins, Thomas E.</i> , on the detection of strychnia and other proximate principles.....	527
<i>Johnson, George</i> , on <i>Acetum ipecacuanhæ</i> .....	139
Juice of <i>Chelidonium majus</i> .....	474
Kakui or Kekune oil.....	62
Kerosolene.....	396
Kinic acid in the leaves of <i>Vaccinium myrtillus</i> .....	128
<i>Koenig, M.</i> , on the action of sulphate of copper as a preservative of wood.....	541
<i>Kopp, M. E.</i> , on the preparation of artificial coloring matters from coal tar.....	39, 129, 245
<i>Kosmann, M.</i> , on the constitution of digitalin.....	69
Latour bark.....	409
Lead cerate.....	407
<i>Lemaire, M. J.</i> , on the use of phenic acid for disinfecting purposes, and its mode of action.....	550
<i>Lepage, M. H.</i> , note on French opium.....	457
Lint.....	359
Liebig's condenser, an improvement on.....	215
Liquor guttæ perchæ chloroformicus.....	201
Liquor potassæ, on the preparation of.....	241
Liquid carbonic acid, properties of.....	228

Liquid diffusion applied to analysis.....	513
Lithium and its salts.....	75
Lithium in fertile soils.....	222
<i>Loir &amp; Drion</i> , on the solidification of carbonic acid .....	529
<i>Ludwig &amp; Lange</i> on the myronate of potassa.....	236
Lupulin.....	77
<i>Ludolt M.</i> , on the detection of parffin in wax.....	545
<i>Mackay, M.</i> , some remarks on shellac with special reference to its present commercial condition .....	440
<i>Maisch, John M.</i> , on <i>Chelidonium majus</i> .....	7
“ “ on the adulteration of carmine.....	17
“ “ on commercial iron by hydrogen.....	20
“ “ on the importation of mineral waters.....	97
“ “ analysis of the chalybeate waters of Sharon Spring, N. Y. ....	105
“ “ on anacahuite wood.....	107
“ “ on the tincture and ferrated tincture of bark.....	193
“ “ on the origin of bay rum.....	289
“ “ on the volatile oil of <i>Myrcia acris</i> .....	296
“ “ on the ferrated tincture of cinchona.....	304
“ “ on the conversion of monohydrated into common phos- phoric acid.....	385
“ “ gleanings from the German journals.....	110, 215, 312, 402
“ “ chemical examination of coca leaves.....	496
Malleable amalgam for dentists.....	128
Manufacture of oxygen.....	145
Manufacture of pure phosphoric acid.....	475
Mannite in the leaves of <i>Ligustrum vulgare</i> .....	215
Mannite in <i>Scorzonera hispanica</i> .....	318
Manna and mannite, chemical researches on.....	26
Manure from the air, production of valuable.....	546
<i>Marguerite and De Sourdeval</i> , on the production of ammonia from the air....	546
Mastic, collection of.....	61
Maturation of fruits.....	230
<i>Melzar, A. P.</i> , on carrageen.....	74
Medicinal aconitia and its substitutes.....	100
Meeting of the American Pharmaceutical Association, postponement of the .....	377
Meeting of the British Association of Manchester, Sept. 5, 1861.....	481
Memorial to the Secretary of the Treasury relative to the drug examinership .....	281
Method of preserving cut flowers.....	381
Metamorphia, a new alkaloid from opium.....	24
Metamorphia, medicinal properties of.....	408
<i>Nicolasch, C. H.</i> , on the volatile oil of <i>Pinus pumilio</i> .....	453
<i>Millingtonia hortensis</i> , on the bark of.....	507
Mineral waters, importation of.....	97
Mineral water syrup.....	309
Minutes of the Philadelphia College of Pharmacy.....	281, 481



<i>Moore, J. F.</i> , on extract and fluid extract of <i>cimicifuga</i> .....	343
Mode of dissecting leaves.....	551
Morphia and marshmallow syrup.....	409
Moulding of plasters, to prevent the.....	314
Mummies used in medicine.....	109
Musk deer, an account of the Himalayan.....	259
Musk, adulterations of.....	429
Musk, method of examining.....	427
<i>Myrcia acris</i> .....	291
<i>Myrcia pimentoides</i> .....	293
<i>Myrcia acris</i> , volatile oil of.....	296
Myronate of potasse from black mustard.....	236
Narcotina, chemical constitution of.....	366
Native nitrate of soda in Brazil.....	502
New filter.....	32
New weights of the British Pharmacopœia.....	89
New salt of iron of quinia.....	238
New by-law of the Philada. College of Pharmacy regarding the herbarium	283
New acid by the oxidation of nitrobenzin.....	329
New Zealand iron-sand.....	330
New Canadian dye.....	366
New source of sulphur in the sulphuric acid manufacture.....	482
New anæsthetic, on Kerosolene, a.....	396
New iodine spring.....	406
Note on blood stains.....	438
Non-inflammable clothing.....	541
New test for diabetes.....	475
Nitrate of lithia.....	77
Nitrate of soda in Brazil.....	502
Nitrobenzole, preparation of.....	133
<i>Niemann, Dr. Albert</i> , on the alkaloid of coca leaves.....	122
Nitric acid stains, on the removal of.....	111
<i>Noad, Henry M.</i> , on the chemical constitution of narcotina and its decomposition.....	366
Note on Persian opium.....	48
Note on monohydrated sulphuric acid.....	175
Note on French opium.....	457
Norwegian castor.....	557
Obituary—Thomas Southall.....	192
“ Dr. Klotzsch.....	192
“ Joseph Laidley.....	497
Observations on the Etua tree ( <i>Kiglia Africana</i> ).....	550
Onanthic acid.....	312
Officers of the Philadelphia College of Pharmacy.....	184
Oil filter.....	13

Oil of bitter almonds, its commercial purification.....	435
Oil of cajeput.....	545
Oleum etherium.....	57
Oleum cadinum.....	110
Oleum gossypii.....	208
Oleum morrhue ferratum.....	317
Opium, Persian.....	48
Opium in France, production of.....	52
Origin of bay-rum.....	290
Organic hyperoxides.....	113
Our school of pharmacy.....	288
Our subscribers and the mail.....	384
Oxalate of lithia.....	76
Oxalate of ammonia, effects of, on the precipitation of Prussian blue.....	363
Oxalic acid, new process for.....	483
Oxide of lithia.....	75
Oxidation of the proto-salt of iron.....	317
Oxygen, manufacture of.....	145
Oxyacanthin.....	455
Ozone in the mineral kingdom.....	222
Ozone a means of restoring old and faded engravings, &c.....	539
 Panis laxans.....	 115
Paper from Indian corn leaves.....	232
Para-cajeputin.....	546
Paraffin as a lubricant for alkali bottle stoppers.....	502
Paraffin substituted for wax.....	72
Paraffin in Boghead slate.....	219
Parrish, Edward, and W. C. Bakes on fashion and fancy in pharmacy.....	1
"    "    patents in their relation to pharmacy.....	141
"    "    Note on the supposed chemical compound of tannic acid, ether and water.....	207
"    "    on kerosolene.....	396
Pasteur, M. L., on the origin of ferments.....	165
Patents in their relation to pharmacy.....	141
Peake, M. F., description of the Himalayan musk deer, its haunts and the method of taking the musk.....	259
Penghawar djambi.....	54
Pentachloride of phosphorus on camphor, action of.....	218
Persian opium.....	48
Permanganic acid.....	315
Permanganic acid, composition and properties of.....	557
Perchromic acid.....	317
Percolation under strong pressure.....	319
Perchloride of iron, neutral solution of.....	327
Persoz, M. J., on the estimation of commercial saltpetre.....	543
Pettenkoffer, Michael, on the preparation of chloroform.....	42

Pharmaceutical apparatus.....	12
Pharmaceutical and chemical labels for cabinets of specimens.....	93
Pharmaceutical education.....	476
Pharmacopœia of 1860.....	383
Pharmacy, fashion and fancy in.....	1
Phosphate of lithia.....	76
Phosphate of sesqui-oxide of iron.....	294
Phospho-molybdic acid.....	312
Phospho-molybdate of ammonia.....	112
Phosphorus, detection of.....	126
Phosphoric acid, conversion of glacial into common.....	385
Phosphoric acid, manufacture of pure.....	475
Phenic acid (creasote) for disinfecting purposes.....	550
<i>Pile, Jr., Wilson H.</i> , on cane sugar in its relation to syrups.....	197
Pills of iron by hydrogen.....	206
Pills of camphor.....	206
Piperidina and picric acid.....	218
Plasma plumbi.....	256
Platinum retorts, glass substituted for, at Manchester, England.....	482
<i>Playfair, Dr. Lyon</i> , note on monohydrated sulphuric acid.....	175
<i>Pohl, Dr. J. J.</i> , on white gunpowder.....	511
Poisoning by cyanide of potassium.....	217
Postponement of the meeting of the American Pharmaceutical Association.....	377
Podophyllin.....	301
Polysulphides of the heavy metals.....	264
Pomata contra varos.....	116
Powdered camphor.....	68
Preparation of artificial coloring matters from coal tar.....	39, 129
Preparation of antimoniate of potassa.....	111
Preparation of an ethereal solution of binoxide of hydrogen.....	114
Preparation of citrate of magnesia.....	121
Preparation of nitro-benzole.....	133
Preparation of iron by hydrogen and its preservation.....	152
Preparation of subnitrate of bismuth.....	172
Preparation of liquor potassæ.....	241
Preparation of smelling salts.....	351
Preparation of chloroform.....	421
Preparation of bones for use as manure.....	463
<i>Procter, Jr., William</i> , bitter wine of iron.....	18
"    "    on tincture of arnica.....	11
"    "    on medicinal aconitia and its substitutes.....	100
"    "    gleanings from the French journals.....	212, 319, 411
Production of opium in France.....	52
Production of alcohol in the United States.....	66
Production of conium seeds in the United States.....	136
Production of intense cold.....	223
Production of valuable manure from the air.....	546

Production of alizarin from naphthalin.....	558
Proximate analysis of plants and vegetable substances, by Dr. Rochleder, 81, 177, 273, 369, 465, 561	
Properties of benzole.....	133
Properties of liquid carbonic acid.....	328
Progress of the British Pharmacopœia.....	477
Prizes distributed by the French academy.....	415
Pure carbonate of soda.....	404, 317
Pus, analysis of.....	403
Purification of vegetable juices .....	460
Purification of silver.....	318
Quercitron in buckthorn berries.....	219
Reaction of strychnia.....	110
Reactions of cholestearin.....	312
Reactions of quinia.....	410
Recognition of phosphates in urinary deposits.....	411
Redwood, Dr. Theophilus, on the preparation of liquor potassæ.....	241
Report on suppositories.....	115
Report on <i>Asclepias tuberosa</i> , Dr. Pawling's.....	494
Report of the botanical committee, by J. M. Maisch.....	285, 485
Report on the chemical manufactures of South Lancashire.....	482
Resinoids, on the.....	299
Resins and aqueous extracts of jalap.....	481
Reveil, Dr. O., note on Persian opium.....	48
Rhoads, Elam, on <i>asclepias tuberosa</i> .....	492
Ricinate of magnesia.....	416
Rochleder's proximate analysis.....	89, 177, 273, 369, 465, 561
Rosin, products of the distillation of.....	240
Rock oil as a fuel for steam engines.....	378
Rousseau, M. Emile, purification of vegetable juices.....	460
Roussin, M. Z., on the production of alizarin from naphthalin.....	558
Saccharine substances of acid fruits.....	213
Sale of poisons in France.....	176
Salep.....	404
Salisburia adiantifolia, the nuts of.....	502
Saltpetres, estimation of commercial.....	543
Salts of copper, lead and tin in newly distilled spirits.....	504
Scammony.....	216
Scammony resin, on the constitution of.....	430
Scheil, J., on the products of the distillation of rosin.....	240
Schiff, Hugo, on the polysulphides of the heavy metals.....	264
Schmidt, M., on the oil of cajeput.....	545
Schoff, Prof., on some species of hellebore.....	426
Schwabe, M., on a new cinchona alkaloid.....	173, 417

Separation of acetic ether.....	411
Separation of phosphoric acid.....	114
Separation of cadmium from copper.....	312
<i>Shinn, James T.</i> , on mineral water syrups.....	309
Shellac, some remarks on.....	440
<i>Simmonds, P. L.</i> , on the sponge fishery of the Ottoman Archipelago.....	28
"    "    on the sponge fishery of the Bahamas.....	356
<i>Simon, Joseph</i> , on zeiodelite.....	153
Silicon in iron.....	115
Silver coins, amount of lead in.....	335
Skeletonizing leaves, &c.....	551
Solutio atropiæ glycerinæ.....	64
Solution of persulphate of iron.....	266
Solution of starch.....	312
Solution of perchloride of iron.....	327
Solubility of starch.....	318
Solubility of tannic acid in ether.....	337
Solubility of sulphate of ammonia.....	406
Solidification of carbonic acid.....	529
Sponge fishery of the Ottoman Archipelago.....	28
Spontaneous decomposition of chloride of lime.....	72
Spontaneous generation, researches on.....	241
Spermaceti ointment.....	155
Spectrum analysis.....	224
Sponges, touching.....	332
Sponge fishery of the Bahamas.....	356
<i>Spirgatis, H.</i> , on the constitution of scammony resin.....	430
Specific gravity of ammonia.....	403
<i>Squibb, Dr. E. R.</i> , on oleum etheræum.....	57
<i>Stearns, Frederick</i> , on the production of alcohol in the United States.....	66
Starch from cassava.....	270
Strychnia, color-tests for.....	517
Strychnia, detection of.....	527
Strychnia for santonin, mistake of.....	404
Stone-ware manufacture for chemical purposes.....	535
Suppositories.....	115
Suppositories, preparation of.....	202
Suppositor.....	202
Sugar-coating pills for prescriptions.....	206
Sugar in relation to syrups.....	197
Sulphate of lithia.....	76
Sulphate of copper as a preservative of wood.....	541
Sulphuret of lithium.....	76
Sulphuric acid, on monohydrated.....	175
Sulphurous powder.....	214
Syrupus assafoetidæ.....	211
Syrupus anthemidis.....	391



Syrup of grape juice.....	310
Syrup of strawberries.....	311
Syrup of orange.....	311
Syrup, simple.....	311
Syrup of santonin.....	320
Supposed new element of the sulphur group.....	362
Surgical prize of the French Academy, grand.....	505
Tables of tests of the organic alkalis.....	528
Tannin in ether.....	219
Tannic acid, discrepancies relative to its solubility in ether.....	337
Tannic acid, ether and water, on a compound of.....	207
Tar and copaiba.....	381
Tartar in vinegar, detection of.....	148
Test for strychnia.....	218
Test for sulphuric acid.....	404
Tests for strychnia, the color.....	517
<i>Thompson, William S.</i> , on the citrate of iron and quinia.....	265
<i>Thompson, Dr. Murray</i> , on hydriodate of ammonia.....	346
<i>Thirault, M.</i> , on glycerin pomade of iodide of potassium.....	236
<i>Tickbourn, Charles R. C.</i> , on solutio atropiæ glycerinæ.....	64
Tin.....	147
Tin in vinegar.....	115
Tin and terchloride of gold.....	316
Tinctura acnica.....	11
Tinctura aconiti radidis.....	104
Tinctura ferri protochloridi.....	111
Tincture and ferrated tincture of bark.....	193
Titration of iodine and bromine.....	220
Titration of burned lime.....	314
Titration of lye for carbonic acid.....	315
Titration of alumina in alum.....	316
Titration of tin.....	405
<i>Tilyard, Charles S.</i> , on plasma plumbi.....	256
Tough points of lunar caustic.....	415
Transformation of nitrobenzole to anilin.....	134
<i>Tufts, Charles A.</i> , on hops and lupulin.....	77
<i>Turner, J.</i> , on arsenious acid in large doses as a substitute for quinine.....	556
Tubular condenser.....	498
<i>Uboldini, G.</i> , action of various reagents on iodide of potassium.....	170
Uncertainty of composition of the aqua lauro-cerasi.....	455
United society of chemists and druggists.....	91
Uses of glycerin.....	111
Use of balsam of Peru in the Roman Catholic Church.....	262
Use of cyanide of barium.....	403
Use of phenic acid for disinfecting purposes.....	550

Unripe figs, caustic juice of.....	215
Urate of soda.....	402
Valerian, therapeutic properties of essence of.....	239
Valerianate of ammonia.....	345
Valuation of chloride of lime.....	347
Value of different kinds of soap .....	355
Varieties.....	377
Varnish to prevent rust in iron and steel.....	319
Vegetable juices, purifications of.....	460
Veratric acid.....	115
<i>Vinke, Dr.</i> , on penghawar djambi.....	54
Volatile oil of pinus pumilio.....	453
Volumetric estimation of tannin.....	164
Volumetric estimation of nitrous acid.....	216
Volumetric estimation of phosphoric acid and arsenic.....	404
<i>Wacker, Charles</i> , on oxyacanthin.....	455
Wadding from asclepias syriaca.....	320
Wafer envelopes.....	4
<i>Walz, G. F.</i> , on arnica montana.....	450
Want of honesty in making pharmaceutical preparations.....	93
Water cisterns at Venice.....	79
Water, on the color of.....	509
<i>Watson, William J.</i> , preparation of citrate of magnesia.....	121
<i>Warner, William R.</i> , on some pharmaceutical apparatus.....	12
Wax, adulteration of, with paraffin.....	545
<i>Weatherly, William H.</i> , on oleum gossypii.....	208
White gunpowder.....	510, 511
<i>Wittstein, Dr. G. C.</i> , on metamorphia, a new alkaloid from opium.....	24
<i>Wittstein, Dr</i> on the color of water.....	509
Wine of citrate of iron and quinia.....	109
What to observe in lichens.....	364
<i>Wood, Dr. B.</i> , on cadmium.....	148
Wood's fusible metal.....	356
Wood, action of sulphate of copper as a preservative of.....	541
Working in aluminium.....	552
Works of Lavoisier.....	416
Yellow poppy seed oil.....	80
Yellow color of decoction of althea, cause of the.....	317
Zeidelite, on.....	155
<i>Zwenger, M. C.</i> , on daphnin.....	325
“ “ on kinic acid in the leaves of vaccinium myrtillus.....	128

